

Seed Testing

INTERNATIONAL

ISTA News Bulletin No. 127 April 2004



Interpreting TZ staining patterns at the Forest Research Institute Liptovsky Hradok Slovakia

page 34



IN THIS ISSUE

SEED TECHNOLOGY

Challenges for the production of high quality organic seed
12

REGIONAL NEWS

Workshop in the detection of GM Crops
16

TECHNICAL COMMITTEES

Proficiency Test Programme for Flower Seed Testing
26

An Introduction to the ISTA Technical Committees
28

ISTA Forest Tree Seed Workshop
34

ACCREDITATION

The Ring Test Programme
44

Vigour Testing - Proficiency Test for the Conductivity Test for *Pisum sativum*
48

MEMBERSHIP

Calendar
57

Seed Testing INTERNATIONAL



EDITORIAL OFFICE

EDITOR-IN-CHIEF
Dr. Michael Muschick

CO-EDITORS
Mrs. Sarah Anne Meier
Ms. Patricia Raubo

ADMINISTRATION
Dr. Bettina Kahlert
(Technical Committees)
Ms. Martina Rösch
(Accreditation)

International Seed Testing Association (ISTA)

ISTA Secretariat
Zürichstrasse 50
P.O. Box 308
8303 Bassersdorf
CH - Switzerland

Phone: +41 1 838 6000

Fax: +41 1 838 6001

E-mail: ista.office@ista.ch

Internet: www.seedtest.org

Next Issue

Deadline for article submission:
August 15, 2004

Publication Date of *Seed Testing
International* No. 128:
October 2004

No of copies: 2000

Other ISTA Publications

For information and orders of other
ISTA Publications, please contact the
ISTA Secretariat at the above address, or
visit our website at

www.seedtest.org

Editorial

By Michael Muschick,
ISTA Secretary General



Dear Reader,

The 27th ISTA Congress is standing right before our doors. This congress is not only the best occasion to celebrate the 80th birthday of ISTA, which is coming up this year, but will also be an outstanding congress due to the important decisions that will be taken by the Voting Delegates during the Ordinary Meeting.

The Executive Committee of ISTA has made a proposal to change the current constitution in three areas. As most important among these the Executive Committee made a proposal to the Voting Delegates to change the current voting system for ISTA Rules Proposals, allowing next to the Designated Authorities, also the Member Laboratory Representatives to vote on the Rules Proposals.

The experiment on the accreditation and authorisation of company laboratories to issue ISTA Certificates will elapse with the 27th Congress, where a report on the outcome of the experiment will be presented and the Voting Delegates will decide regarding the success of this experiment.

The decision on the Constitution Change Proposals and on the ongoing of the experiment on the accreditation and authorisation of company laboratories definitely will become milestones in the history of the Association and will influence ISTA's way in the future tremendously.

But not only political issues will be discussed at this Congress. The Seed Symposium from Monday, May 17 -19, 2004 will bring together the leading scientist in the area of seed science and technology and during May 13 and 14 the 18 Technical Committees of ISTA with members from governmental, private and company seed testing laboratories, universities and research stations will get together to discuss and decide regarding the working programme of all ISTA Committees for the next three years.

So, I invite you cordially to attend the 27th

ISTA Congress in Budapest, Hungary to celebrate ISTA's 80th birthday and to be part of the most outstanding event in the area of seed science and technology.

ISTA starts to focus its activities also in the area of organic seed. ISTA is the partner organisation in the First World Conference on Organic Seed from July 5 - 7, 2004 at the headquarters of FAO. Please find in this issue an article regarding organic seed and quality control for organic seed. The topic of organic seed will also be picked up during the ISTA Congress and discussion regarding the establishment of an ISTA Task Force for organic seed will take place.

Nevertheless our 80 year old ISTA lady is quick and vigorous like a young maid. Therefore find a number of reports from the various activities of the different workshops that have taken place all over the world.

Enjoy particularly the two papers from the Seed Health Symposium in Wageningen.

I sincerely hope you will enjoy the lecture of this issue of *Seed Testing International* and I am looking forward to meet and discuss with you all at the 27th ISTA Congress in Budapest, Hungary.

Yours
Michael Muschick

CONTENTS

PRESIDENT'S REPORT	2
---------------------------	---

COVER ARTICLE	3
----------------------	---

MEMBERSHIP MEETINGS	
ISTA Seed Symposium 2004 Programme	4
Final Programme 27 th ISTA Congress	6
Proposed changes to the ISTA Constitution	7

ISSUES OF COMMON TECHNICAL INTEREST	
Challenges for the production of high quality organic seed	12

REGIONAL SEED NEWS	
Workshop in the Detection of GM Crops	16
2 nd Int'l Conference "Healthy Seed for Healthy Crop"	24

TECHNICAL COMMITTEES	
Healthy Seeds, the basis for Sustainable Farming	19
Proficiency Test Programme for Flower Seed Testing	26
1 st ISTA Open Forum on (Semi-)Quantitative GMO Testing	27
The ISTA Proficiency Test on GMO Testing	27
An Introduction to the ISTA Technical Committees	28
3 rd ISTA/FAO Workshop on GMO Detection	32
ISTA Variety Testing Workshop - Way to the Future	33
ISTA Forest Tree Seed Workshop	34
AVRDC-ARC/ISTA/APSA Seed Testing Workshop	36
1 st ISTA Moisture Testing Workshop	38
Announcements of Upcoming Workshops	40

ACCREDITATION	
The Ring Test Program - Benefits and Difficulties	44
QA Workshop in Cairo	47
Vigour Testing - Proficiency Test for the Conductivity Test for <i>Pisum sativum</i>	48
Report on the ILAC/IAF 2003 General Assembly	50
Newly and Re-accredited ISTA Laboratories	50

MEMBERSHIP	
New ISTA Members and Membership Mutations	52
ISTA Membership Application Form	53
Calendar	57

MEETINGS	
ISF World Seed Congress 2004	54
First World Conference on Organic Seed	55
ISTA Participates at the Asian Seed Congress 2003	56



Seed Researchers from the Plant Research International, Wageningen University and Research Centre in the Netherlands discuss the Challenges for production of high quality organic seed

Page 12



Find a detailed Programme for the 27th ISTA Congress the as well as the Programme for the ISTA Seed Symposium 2004

Page 4



The ISTA Forest Tree Seed Committee hold the 3rd Forest Tree Seed Workshop in Prague, Czech Republic

Page 34



The Announcement of the first World Conference on Organic Seed includes the conference goals and a preliminary programme

Page 55



Read about the upcoming Workshops and Symposiums, as well as Pre-Congress Workshops

Page 40

President's Report

By Norbert Leist, ISTA President

Dear members of ISTA!

The preparations for our 27th Congress in Budapest have been concluded for the most part, and so right now we are concerned with the review and future planning. Due to our extraordinary meetings, which we have been conducting since our last Congress in Angers, we are able to implement our goals in a close time range and in addition intensify our contacts with all relevant partners working in the seed market - regional and international. There are two areas in which we have succeeded so very successfully:

- the effective advancement of the GMO Task Force
- the conduction of workshops in all parts of the world

According to our constitution, the workshops are part of the Primary Purposes: "to promote uniform application of the standard procedures for sampling and testing seeds for evaluation of seeds moving in international trade" (Article III a). According to this we have since 2002 conducted three workshops for the GMO Task Force - which was accorded great priority - in South America, Africa and Asia. Two additional workshops are planned for 2004 in Eastern Europe and the Middle East. The major goal of these workshops is the training in methods and therefore a contribution to our superordinate goal - uniformity in seed testing.

In addition to this at the end of each workshop-week, when all participants say their good byes, we find once more that we have met deeply committed seed testers of all ages, from all countries, from governmental, private and company owned laboratories. One week of joint work and discussion on a clearly defined topic strengthens the expert competence of all and at the same time promotes the possibility to get a better estimation of one's own qualities and to achieve greater social competence in respecting others and understanding their views.

In doing so, one week of working together

gives you insight into distinctive features, the social and economical conditions under which our colleagues conduct their daily work and a chance to appreciate national and ethnic problems and worries as well as skills and merits. In doing so we build a network of communication - which is greatly supported by the new technologies such as e-mail - that promotes the cohesion and further exchange of ideas, thoughts and information and thereby enriching and enlarging the expert knowledge of each participant since he or she is now personally acquainted with a number of contacts for special problems. We cannot appreciate high enough this exchange of information which results from the participation in the workshops, since it enlarges the expert knowledge, promotes the cooperation and helps prevent misunderstandings.

ISTA has made use of this highly efficient tool in order to transfer and spread knowledge on methods for seed testing since its foundation. The successful realization of this task has to be attributed to the Chairs of our Committees who are undertaking the intensive preparation and conduction of the workshops enthusiastically, honorary and without pay. They all deserve our deepest respect and gratitude. With their commitment they contribute to the development, improvement and uniform implementation of methods.

This serves the purpose of the seed economy as well as that of the governmental organisations which can rely on the fact that the ISTA certificate gives them reliable and worldwide identical information on the quality of a seed lot. A product of similar quality is hard to find in other expert fields. It is no coincidence that ISTA and ISF both were founded in the same year and are in close contact ever since. In 1930 ISTA introduced the Orange Certificate on demand of the ISF. In 1950 FIS was founded again on suggestion of ISTA. All this indicates a very successful cooperation. On the one hand the trade partners will always have new demands and wishes due to new technologies and



changing circumstances. ISTA on the other hand will continue to develop the tools for scientifically exact, timely and acceptable as well as internationally recognized methods.

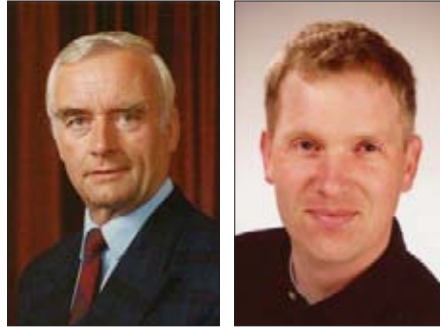
Seed breeders, trade companies, governments and seed buyers can rely on the correct application of the clearly defined ISTA methods by educated analysts, which certify their competence through accreditation in proficiency tests and audits. I have read the excellent contribution of Prof. Dr. Dr. Steiner in this issue, who underlines exactly this point, with great pleasure: Seed as an achievement of mankind, which as a basic commodity enables and ensures the existence of our cultures in all its facets. The fact that we are all concerned with this good and pay our contributions to ensure the indisputable determination of its quality fills me time and again with deep satisfaction.

I am looking forward to greet you all as members of the great ISTA-family at our 27th congress in Budapest.

**Your President
Norbert Leist**

Facts to remember, a commendatory memento

By Adolf Martin Steiner,
retired ISTA Member and
Michael Kruse, ISTA Member



*All the flowers of all of the tomorrows
are in the seeds of today.*

Chinese-Indian proverb

The ISTA 27th Congress and Seed Symposium 2004 in Budapest, Hungary, is approaching and with it the 80th anniversary of the formation of ISTA. A great number of attendants will participate there in the numerous meetings. Hence, anybody not so familiar with seed matters may ask on this occasion: How about seeds? Are the efforts and troubles taken to run such a Congress and even such an association as ISTA standing behind it reasonable and appropriate? What role do seeds play today? What is the actual value of seeds? And, in case, what are the distinguishing attributes of seeds making them valuable?

Well, the community of seed scientists, the community of seed analysts, the body of seed industry enterprises, the lobby of seed trade companies and the delegation of government representatives gathering at Budapest do truly consider and appreciate seeds as one of the most valuable commodities if not as the most valuable commodity at all donated to mankind. For testing and verifying this, let us have a look to the various actual and unique attributes of seeds putting them right into the focus of present-day as well regional as also global economic and socio-political interests:

Seeds are the

- basic and not replaceable commodity for the production of
 - i. food and feed crops
 - ii. renewable primary product plants
 - iii. renewable energy plants
 - iv. amenities for joy of life, and for
 - v. landscape management and environmental protection
- carrier of the progress in plant breeding
- carrier of the progress in seed technology
- carrier of gene technological achievements
- subject of the enforcement of plant variety protection and of patent rights

- carrier of plant genetic resources
- carrier of plant biodiversity
- subject of *ex situ* conservation of plant genetic resources and biodiversity
- commodity in regional and global trade

quintessentially, seeds are and preserve creation.

In the light of this listing, nobody can call into question the fundamental role which seeds play today world wide. Looking at starvation in the Third World's Countries, the primary remedy are quality seeds. Looking at improvement of agricultural production in Developed Countries, the driving force are quality seeds. Looking to the future of agriculture in general, the most promising tool are value-added quality seeds. ISTA and the attendees representing the different aspects and interests regarding seeds at the ISTA Congress and Seed Symposium in Budapest can take pride in being involved and engaged in the promotion and advancement of the precious commodity seeds by research, by quality testing, by technological improvement, by making them available to the consumers and by setting the regulatory frame for the matters pertaining to seeds. All these groups together in co-operation secure assured availability of quality seeds to the user for the benefit of sustainable plant production. Everyone shall have foods, everyone shall have flowers. Let us very carefully handle and preserve seeds as an immeasurable and invaluable treasure of creation in a competent, considerate and prudent way. Let us tell the world: there is no life without seeds. This conclusion and creed deserves to become the pivotal message when looking back on 80 years of well-proven and always future-oriented work of the International Seed Testing Association ISTA and when simultaneously looking forward to the forthcoming 27th ISTA Congress and Seed Symposium 2004 in Budapest.

***Most can raise the flowers now,
For all have got the seed.***

Alfred Lord Tennyson (1809-1892), English poet laureate ■

The 27th ISTA Congress

Budapest, Hungary
May 13 - 24, 2004



The ISTA Seed Symposium during the 27th ISTA Congress will be 'the largest international gathering of applied seed scientists and an unique forum for the interchange of ideas between seed scientists and technicians' according to ISSS.

'Towards the Future in Seed Production Evaluation and Improvement', is the theme of the Seed Symposium. Scientists from 45 countries worldwide submitted over 290 high quality papers of various interesting topics and for the seven sessions of the seed symposium. (See page 4 - 5 for details)

Six papers will be presented as oral presentations in each of the session. Three key-note speeches will complete the programme. A detailed programme can be found on the next two pages of this issue of *Seed Testing International*. An abstract booklet of all submitted papers will be distributed at the congress to all congress participants.

We have the pleasure to announce two ISTA Workshops which are part of the pre-congress ISTA activities: ISTA Seed Health Committee Workshop, Novi Sad, Serbia and Montenegro, May 6 - 11, 2004, and ISTA Purity Workshop, Budapest, Hungary, May 11 - 12, 2004. Please find more information on page 41 and 42.

The Congress Programme can be found on page 6, and for more details on the proposed ISTA Constitution changes see page 7.

ISTA Seed Symposium 2004

“Towards the future in seed production,
evaluation and improvement”



TIME	Monday, May 17, 2004
08.30 - 10.00	OPENING CERMONY - Official Address by the Representative of the Hungarian Minister of Agriculture & Regional Development - Opening by the ISTA President - Welcoming Address by the ISTA Secretary General - Welcoming Address by the Organisers - Greetings from other International Organisation
10.00 - 10.30	COFFEE BREAK
10.30 - 11.00	KEYNOTE - Future Developments in the Seed Industry in Eastern Europe , By Zoltan Syposs, Hungary
11.00 - 12.00	SESSION 1 - Application of Advanced Technologies, Chaired by Enrico Noli, Italy Oral presentations: - 'A computerised key for seed identification' by M.L. Gupta, D.L. George & B.B. Basnet, Australia - 'Use of near infrared reflectance spectroscopy to indentificate seeds of noxious weeds, forage legume seeds and contamination' by W. Hugo & P. Dominguez, Uruguay - 'Biochemical characterization of white onion ecotypes (<i>Allium cepa</i> L.) through HPLC analysis of seed storage proteins' by G. Mennella, V. Onofaro Sanaja, A. D'Alessandro & M. Milone, Italy
12.00 - 13.00	LUNCH
13.00 - 14.00	SESSION 1 - Application of Advanced Technologies (cont.) - 'Commercial sunflower germplasm identification and characterization using SSR' by A. Vicario, A. Loray, N. Paniego & E. Hopp, Argentina - 'Development of microsatellite markers for the identification of Brazilian <i>Coffe Arabica</i> Cultivars' by E.S.N. Vieira, E.V.R. von Pinho, D.G. Esselink, M.G.G.C. Vieira & B. Vosma, Brazil & the Netherlands - 'Testing for adventitious presence of transgenic material in conventional seed lots using quantitative laboratory methods: a new statistical approach and its implementation' by J.-L. Laffont, K.M. Remund, D.L. Wright & R.D. Simpson, France
14.00 - 15.00	SESSION 2 - Organic & Conventional Seed Production, Chaired by José de Barros França Neto, Brazil Oral presentations: - 'Organic seed treatment to control common bunt (<i>Tilletia tritici</i>) in wheat' by A. Borgen, Denmark - 'A comparative study of the germination characteristics of wild flower seeds in commercial seed production' by M. Khajeh-Hosseini, A.A. Powell & G.K. LaVerack, United Kingdom - 'Varietal characterization and genetic purity assessment of castor (<i>Ricinus communis</i> L.) genotypes' by R. Ankaiah, N. Manohar Reddy K. Keshavulu, P. Sambasiva Rao, India
15.00 - 15.30	COFFEE BREAK
15.30 - 16.30	SESSION 2 - Organic & Conventional Seed Production (cont.) - 'The effect of glyphosate treatment on the germination potential of barley seed' by G. McLaren & R. Don, United Kingdom - 'Challenges for obtaining high quality organic seeds' by S.P.C. Groot & W.J. van der Burg, The Netherlands - 'Effect of desiccation on some quality characteristics' by M. Rajic, B. Marinkovic, V. Miklic & L. Pankovic, Serbia and Montenegro
16.30 - 17.30	SESSION 3 - Viability and Vigour: Evaluation and Impact, Chaired by Joël Léchappé, France Oral presentations: - 'Relationship between standard and cold germination tests in supersweet sweetcorn' by D.L. George, M.L. Gupta & I.G.M.A. Parwata, Australia - 'Assessment of reliability of germination papers in environmental stress research' by M. Khajeh-Hosseini, A.A. Powell & I. Bingham, United Kingdom - 'Assessment of viability of bread wheat (<i>Triticum aestivum</i> L.) and oats (<i>Avena sativa</i> L.) germplasm samples stored over 30 years in cold store' by L. Holly, R. Bócsó, A. Juhász & I. Már, Hungary
TIME	Tuesday, May 18, 2004
08.30 - 09.00	KEYNOTE - Development of Education and Training in Seed Science and Technology , By Murray Hill, New Zealand
09.00 - 10.00	SESSION 3 - Viability and Vigour: Evaluation and Impact (cont.) - 'Vigour testing: towards an extended use of the conductivity test' by M.-H. Wagner, A. Preveaux, E. Moizan, M. Beaulaton & S. Ducournau, France - 'Vigour tests for predicting seedling emergence of aubergine (<i>Solanum melongena</i> L.) seed lots' by I. Demir, S.Ermis, G. Okcu & S. Matthews, Turkey & United Kingdom - 'Performance of osmoprimed seed of germplasm of desi and kabuli chickpeas under laboratory and field conditions' by S.J. Singh & K. Singh, India

10.00 - 10.30	COFFEE BREAK
10.30 - 11.30	SESSION 4 - Seed Systems in Emerging and Developing Economies, Chaired by Grete Tarp, Denmark Oral presentation: - 'High quality rice seed production - Santa Catarina model' by R. Knoblauch, Brazil - 'Applied tree seed technology in Brazilian Atlantic forest' by Fatima C.M. Piña-Rodrigues & E.S. Nogueira, Brazil - 'Seed sector development and seed policies implemented in Turkey' by B. Bozkurt, K. Yalvec & O.F. Bal, Turkey
11.30 - 12.30	POSTER SESSION 1
12.30 - 13.30	LUNCH
13.30 - 14.30	SESSION 4 - Seed Systems in Emerging and Developing Economies (cont.) - 'Potential of on-farm practices for improving rice seed quality, seed health and crop production' by S.B. Mathur, C.N. Mortensen, M.H. Talukder & R.B. Mabagala, Denmark, Bangladesh & Tanzania - 'Seed Programme Development in a Transition Economy - the Experience of Vietnam' by T.D.N. Dung & M. Turner, Vietnam - 'Seed sector development in South Western Nigeria: Farmers' utilization of improved seed for crop production' by I.O. Daniel & J.A. Adetumbi, Nigeria
14.30 - 15.30	SESSION 5 - Seed Lot Hygiene, Chaired by Ákos Mesterhazy, Hungary Oral presentations: - 'Black Rot Eradication Treatments on Brassica: Efficacy and Seed Quality Investigations' by A.G. Taylor, J.D. Klein & R.H. Morrison, United States - 'Factors affecting the occurrence of <i>Fusarium</i> spp. in cereal seeds in Norway' by G. Brodal & O. Elen, Norway - 'Seed borne barley stripe mosaic virus in Egypt: Incidence, effect of virus and seed-transmissibility' by S. Zein & A. Aboul-Ata, Egypt
15.30 - 16.00	COFFEE BREAK
16.00 - 17.20	SESSION 5 - Seed Lot Hygiene (cont.) - 'Mycological aspects of onion seed priming' by H. Dorna, R. Marcinek, D. Szopinska & Wei Yahong, Poland & China - 'Health Status of Sweet Corn Seeds in China and Its Impact on Seedling Emergence' by Z. Guangwu, Z. Guozhen & W. Jianhua, China - 'Using seed health testing results to make balanced seed management decisions' by V. Cockerell & M. McNeil, United Kingdom - 'Disease Free Seed Production of Wheat in Punjab (India): Achievements and Constraints' by R.C. Sharma, I. Sharma & J.S. Samra, India

TIME	Wednesday, May 19, 2004
08.30 - 09.00	KEYNOTE - Molecular methods and the future of seed testing , By G. Sadler, United Kingdom
09.00 - 10.00	SESSION 6 - Seed Improvement, Chaired by Hugh W Pritchard, United Kingdom Oral presentations: - 'Effects of sand priming on germination, physiological changes and field performance in direct-sown rice (<i>Oryza sativa</i> L.)' by J. Hu, Z.Y. Zhu, W.J. Song, J.C. Wang & R. Naganagouda, China - 'Enhancing seed germination rate of four turfgrass genera by acid treatments' by H. Salehi & M. Khosh-Khui, Iran - 'The use of rapid ageing and controlled deterioration to evaluate iodine vapour treatments to improve seed storage potential' by N De Atrip, S Matthews & A.A. Powell, United Kingdom
10.00 - 10.30	COFFEE BREAK
10.30 - 11.30	SESSION 6 - Seed Improvement (cont.) - 'Sulphuric acid scarification effects on <i>Brachiaria brizantha</i> , <i>B. humidicola</i> and <i>Panicum maximum</i> seed dormancy releasing' by R Usberti & L. Martins, Brazil - 'Effects of different polymer coating materials and applications on the storage life and ageing of onion (<i>Allium cepa</i> L.cv. Aki) seeds: I. Assessment of appropriate polymers and doses' by S. Kavak & B. Eser, Turkey - 'Seed testing and the effect of insecticidal active ingredients on emergence of hybrid maize seed' by A. Jonitz & N. Leist, Germany
11.30 - 12.30	POSTER SESSION 2
12.30 - 13.30	LUNCH
13.30 - 14.30	SESSION 7 - Physiological Basis of Seed Quality, Chaired by Françoise Corbineau, France Oral presentations: - 'Effect of high temperature stress during soybean seed development on germination and vigor' by D.M. TeKrony, D.B. Egli & J. Spears, United States - 'Genetic dissection of maize response to a defoliation treatment during maturation inducing tolerance to cold at germination' E. Frascaroli, E. Casarini & S. Conti, Italy - 'Lipid peroxidation and activity of superoxide dismutase associated with natural aging of oil maize seed' by S. Balešević-Tubic, M. Tatic, J. Miladinovic, D. Malencic, Serbia and Montenegro
14.30 - 15.00	COFFEE BREAK
15.00 - 16.00	SESSION 7 - Physiological Basis of Seed Quality (cont.) - 'The effect of different post-harvest drying methods on seed quality from green (immature) and red (mature) berries of woody nightshade (<i>Solanum dulcamara</i> L.)' by J. Coneybeer, J. Adams & R.J. Probert, United Kingdom - '100-seed test for desiccation tolerance and germination: a case study on eight tropical palm species' by C.B. Wood, S. Hodges, H.J. Vautier & H.W. Pritchard, United Kingdom - 'Seed longevity chart and modeling to predict viability during open storage' by C. Andreoli & R.V. de Andrade, Brazil

Final Programme 27th ISTA Congress

ISTA TECHNICAL COMMITTEE MEETINGS						
TIME	Thursday, May 13, 2004			TIME	Friday, May 14, 2004	
8.30 - 9.55	Nomenclature Committee Meeting	Editorial Board Meeting	Tetrazolium Committee Meeting	8.30 - 9.55	Flower Seed Committee Meeting	Forest Tree & Shrub Seed Committee Meeting
9.55 - 10.10	Coffee Break			9.55 - 10.10	Coffee Break	
10.10 - 11.35	Bulking and Sampling Committee Meeting			10.10 - 11.35	Germination Committee Meeting	
11.35 - 11.50	Coffee Break			11.35 - 11.50	Coffee Break	
11.50 - 13.15	Purity Committee Meeting			11.50 - 13.15	Seed Health Committee Meeting	Accreditation Meeting
13.15 - 14.15	Lunch			13.15 - 14.15	Lunch	
14.15 - 15.40	GMO Task Force Meeting			14.15 - 15.40	Proficiency Test Committee Meeting	
15.40 - 15.55	Coffee Break			15.40 - 15.55	Coffee Break	
15.55 - 17.20	Statistics Committee Meeting			15.55 - 17.20	Moisture Committee Meeting	Vigour Committee Meeting
17.20 - 17.35	Coffee Break			17.20 - 17.35	Coffee Break	
17.35 - 19.00	Variety Committee Meeting	Storage Committee Meeting		17.35 - 19.00	Rules Committee Meeting	

ORDINARY MEETING					
TIME	Thursday, May 20, 2004		TIME	Friday, May 21, 2004	
08.30 - 10.30	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. Discharge of the Executive Committee		08.30 - 10.30	13. Consideration and Adoption of Reports of the Technical Committees; Adoption of Proposed Rules changes 2004 (cont.)	
			10.30 - 11.00	Coffee Break	
			11.00 - 12.30	13. Consideration and Adoption of Reports of the Technical Committees; Adoption of Proposed Rules changes 2004 (cont.)	
10.30 - 11.00	Coffee Break		12.30 - 14.00	Lunch	
11.00 - 12.30	8. Strategic Presentation of the President 9. Experiment of the accreditation and authorisation of seed company laboratories		14.00 - 15.30	14. 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	
12.30 - 14.00	Lunch			15. Any other business raised by consent of the Executive Committee	
14.00 - 15.30	10. Constitution Changes 11. Governance of the Association			16. Election of Officers and Members-at-large of the Executive Committee	
15.30 - 16.00	Coffee Break		15.30 - 16.00	Coffee Break	
16.00 - 18.00	12. Fixation of annual subscription fee 13. Consideration and Adoption of Reports of the Technical Committees; Adoption of Proposed Rules changes 2004		16.00 - 18.00	17. Installation of new officers 18. Announcement of the location and date of the next Ordinary Meetings 19. President's closing address 20. Adjournment	

Proposed Changes to the ISTA Constitution

For consideration and decision at the Ordinary Meeting in Budapest, Hungary, May 20 - 21, 2004

INTRODUCTION

The Executive Committee of ISTA is suggesting to amend the ISTA Constitution and is therefore seeking approval by the Designated Members of proposed changes in the following areas:

I. The introduction of the Annual Ordinary Meetings in the Constitution.

II. The authorisation of ISTA accredited member laboratories to issue ISTA Certificates should be the sole responsibility of the Executive Committee of ISTA.

III. The introduction of a voting system to allow all ISTA members (not only Designated Members) to vote on the ISTA Rules Proposals.

At the Ordinary Meeting of the upcoming ISTA Congress 2004 in Budapest, Hungary, the Designated Members designated by their respective Designated Authority to vote on behalf of the Government in their country, will be asked to vote area by area.

In this document you will find the current text of the Constitution Article of concern on the left side and the proposed new version of the same Constitution Article on the right side. In order to make the necessary changes in the Constitution in one area, it is possible that more than one Article of the Constitution needs to be changed. However, please keep in mind that voting will not be made Article by Article but as a package area by area.

Please take into consideration that according to ISTA Constitution Articles XII (a) and (b), modifications of the text presented in the Constitution Change Proposals can not be made during the Ordinary Meeting.

The Executive Committee of ISTA recommends all of the presented Constitution Change Proposals for adoption by the Designated Members entitled to vote.

According to ISTA Constitution Articles IX (b) and XII (c), the motion to alter the Constitution requires for adoption at least a two-thirds majority of those Designated Members voting, provided a quorum is present.

I. PROPOSED CONSTITUTION CHANGES - ANNUAL ORDINARY MEETINGS

The following changes and amendments of the current Constitution of the International Seed Testing Association are proposed for adoption at the next Ordinary Meeting of the Association to be held in Budapest, Hungary, in May 2004.

I. 1.) It has been proposed to change Article V(b) as follows:

Current Version:

ARTICLE V

Officers

(b) The tenure of office of the President and other Officers shall be from the adjournment of the ordinary meeting at which they were appointed to the adjournment of the ~~next~~ ordinary meeting.

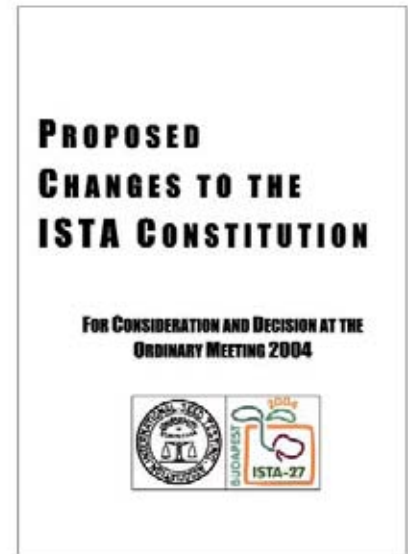
Proposed Version:

ARTICLE V

Officers

(b) The tenure of office of the President and other Officers shall be from the adjournment of the ordinary meeting at which they were appointed to the adjournment of the ordinary meeting held in the third year after the ordinary meeting at which they were appointed.

Rationale for this change: Previously the



ordinary meeting was held once every three years (at the Congress), and thus the appointments were for a three year term. If this clause is not changed, the President and other Officers will only serve a one year term, which is not the intention of the ISTA membership.

I. 2.) It has been proposed to change Article VII(c)(3) as follows:

Current Version:

ARTICLE VII

Executive Committee

(c) ...

(3) In the event of vacancies in the panel of Officers or members-at-large of the Executive Committee, the remaining members of the Committee are empowered to appoint substitutes to serve until the next ordinary meeting of the Association.

Proposed Version:

ARTICLE VII

Executive Committee

(c) ...

(3) In the event of vacancies in the panel of Officers or members-at-large of the Executive Committee, the remaining members of the Committee are empowered to appoint substitutes to serve until the next ordinary meeting of the Association at which the election of officers and members-at-large will be held.

Rationale for this change: Without this change there would be little point in appointing substitutes.

Proposed Changes to the ISTA Constitution

I. 3.) It has been proposed to change Article VII(c)(11) as follows:

Current Version:

ARTICLE VII
Executive Committee

(c) ...
(11) The Executive Committee is empowered to call and summon an International Seed Testing ~~Convention~~ in conjunction with ~~the~~ ordinary meeting of the Association. All such ~~Conventions~~ shall be devoted to the reading of scientific papers, discussions and demonstrations on seed investigations, and such related subjects as appertain to the objects of the Association.

Proposed Version:

ARTICLE VII
Executive Committee

(c) ...
(11) The Executive Committee is empowered to call and summon an International Seed Testing Congress in conjunction with an ordinary meeting of the Association. All such Congresses shall be devoted to the reading of scientific papers, discussions and demonstrations on seed investigations, and such related subjects as appertain to the objects of the Association.

Rationale for this change: ISTA does not use the word "Convention", but always refers to an ISTA "Congress". Before the 2001 decision to move to annual meetings of ISTA, there was only one ordinary meeting every three years (hence the use of the word "the"). As there is now an ordinary meeting every year, "the" becomes incorrect and should be replaced by "an".

I. 4.) It has been proposed to change Article VIII(a) as follows:

Current Version:

ARTICLE VIII
Nomination and Election

(a) At ~~each~~ ordinary meeting of the Association the outgoing First Vice-President, provided that person was duly elected to that office at the previous ordinary meeting, without further election shall be appointed President for the ensuing period. If at ~~any~~ ordinary meeting, for whatever reason, the outgoing First Vice-President is not available for appointment as President, the office of the President shall be filled by election by the procedure prescribed for other officers in paragraphs (b) and (c) of this Article....

Proposed Version:

ARTICLE VIII
Nomination and Election

(a) At the ordinary meeting of the Association which completes the tenure of office of the President and other officers, the outgoing First Vice-President, provided that person was duly elected to that office at the previous ordinary meeting, without further election shall be appointed President for the ensuing period. If at this ordinary meeting, for whatever reason, the outgoing First Vice-President is not available for appointment as President, the office of the President shall be filled by election by the procedure prescribed for other officers in paragraphs (b) and (c) of this Article....

Rationale for this change: Same as for the change proposed to Article V(b), i.e. if this is not changed, there would be a new President every year.

I. 5.) It has been proposed to change Article X(a) as follows:

Current Version:

ARTICLE X
Meetings of the Association

(a) ~~The~~ ordinary meeting of the Members of the Association shall normally be held every ~~third~~ year, but extraordinary meetings may be held when considered necessary by the Executive Committee or when requested by two-thirds of the Designated Members.

Proposed Version:

ARTICLE X
Meetings of the Association

(a) An ordinary meeting of the Members of the Association shall normally be held every year, but extraordinary meetings may be held when considered necessary by the Executive Committee or when requested by two-thirds of the Designated Members.

Rationale for this change: The ISTA membership voted in 2001 to move to annual meetings of the Members of the Association. This change allows this to happen, and removes the need to name meetings held in the years between Congresses "Extraordinary Meetings" i.e. an ordinary meeting each year.

I. 6.) It has been proposed to change Article X(e) as follows:

Current Version:

ARTICLE X
Meetings of the Association

(e) The agenda for ~~the~~ ordinary meeting of the Association shall include:

- (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) Discharge of the Executive Committee.~~
- (8) Consideration and adoption of reports.
- ~~(9) Election of Officers and members at large of the Executive Committee.~~
- ~~(10) Installation of new Officers.~~
- (11) Announcement of the place and date of the next ordinary meeting of the Association.
- ~~(12) Fixation of annual subscriptions.~~
- (13) Any other business raised by a Member, of which notice in writing has been received by the Secretary General at least two months prior to the date of the meeting.
- (14) Any other business raised by consent of the Executive Committee.
- (15) President's closing address.
- (16) Adjournment.

Proposed Version:

ARTICLE X
Meetings of the Association

(e) The agenda for an ordinary meeting of the Association shall include:

- (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) Consideration and adoption of reports.
- (8) Announcement of the place and date of the next ordinary meeting of the Association.
- (9) Any other business raised by a Member, of which notice in writing has been received by the Secretary General at least two months prior to the date of the meeting.
- (10) Any other business raised by consent of the Executive Committee.
- (11) President's closing address.

(12) Adjournment.

And additionally at the ordinary meeting held in the third year after the ordinary meeting at which Officers and members-at-large of the Executive Committee were appointed:

(13) Discharge of the Executive Committee.

(14) Election of Officers and members-at-large of the Executive Committee.

(15) Installation of new Officers.

(16) Fixation of annual subscriptions.

Rationale for this change: Placing the current points 7, 9, 10 and 12 as a sub-set at the end allows for the fact that the Executive Committee has a three year term.

I. 7.) It has been proposed to change Article XI(c) as follows:

Current Version:

ARTICLE XI

Finances

...

(c) The amount of the annual subscription for Designated Members, Members and Accredited Laboratories shall be determined for at least a three-year period at ~~the~~ ordinary meeting of the Association, due consideration being given to statements submitted in accordance with Article VII(c)(9) and paragraph (g) of this Article. Notification of proposals to change the rate of annual subscriptions shall be sent to the Designated Authorities, Designated Members and Members at least six month prior to ~~the~~ ordinary meeting.

Proposed Version:

ARTICLE XI

Finances

...

(c) The amount of the annual subscription for Designated Members, Members and Accredited Laboratories shall be determined for at least a three-year period at an ordinary meeting of the Association, due consideration being given to statements submitted in accordance with Article VII(c)(9) and paragraph (g) of this Article. Notification of proposals to change the rate of annual subscriptions shall be sent to the Designated Authorities, Designated Members and Members at least six month prior to an ordinary meeting.

Rationale for this change: Recognition of the fact that an ordinary meeting is now held annually.

II. PROPOSED CONSTITUTION CHANGES - AUTHORISATION RIGHTS

The following changes and amendments of the current Constitution of the International Seed Testing Association are proposed for adoption at the next Ordinary Meeting of the Association to be held in Budapest, Hungary in May 2004.

II. 1.) It has been proposed to change Article IV(a) as follows:

Current Version:

ARTICLE IV

Designated Authority

(a) A Designated Authority is an authority designated by a government to act on its behalf in designating Designated Members and in liaison with the Association, ~~in particular regarding the accreditation of member laboratories.~~

Proposed Version:

ARTICLE IV

Designated Authority

(a) A Designated Authority is an authority designated by a government of a country or Distinct Economy as recognised by international fora to act on its behalf in designating Designated Members and in liaison with the Association.

Explanation of proposed changes to Article IV

The proposal for change to Article IV (Membership) of the ISTA Constitution is presented with the current version for comparison. The implications of these proposed changes are as follows:

1. The Designated Authority definition has been changed to exclude any reference to accreditation of member laboratories.

(i) Question - Why has this been done?

Answer - It has become evident that many ISTA members believe that accreditation of a member laboratory is solely a technical matter, and that because it is ISTA's accreditation scheme, and ISTA which decides whether a member laboratory has the technical competence (and required QA system) to test seed according to the requirements of the ISTA Rules, it is ISTA which should firstly accredit a member laboratory, and authorise that laboratory to issue ISTA's certificates. There is no technical requirement for a DA to become involved in this process, and so this proposal removes that requirement.

2. The Designated Authority definition now includes the phrase "... government of a country or Distinct Economy as recognised by international fora ...".

(i) Question - Why has this been done?

Answer - This change has been necessary so that ISTA can include all its current members.

II. 2.) It has been proposed to change Article VII(a) as follows:

Current Version:

ARTICLE VII

Executive Committee

(c) ...

(15) The Executive Committee is empowered to approve and publish Accreditation Standards and to accredit member laboratories and, ~~in agreement with the Designated Authority,~~ to authorise such laboratories to issue International Seed Testing Association Certificates.

Proposed Version:

ARTICLE VII

Executive Committee

(c) ...

(15) The Executive Committee is empowered to approve and publish Accreditation Standards, to accredit member laboratories and to authorise such laboratories to issue International Seed Testing Association Certificates.

Reason: if the members vote to remove the DA from any involvement in laboratory accreditation, then this clause will become superfluous.

III. PROPOSED CONSTITUTION CHANGES - VOTING RIGHTS

The following changes and amendments of the current Constitution of the International Seed Testing Association are proposed for adoption at the next Ordinary Meeting of the Association to be held in Budapest, Hungary in May 2004.

III. 1.) It has been proposed to change Article IX as follows:

Current Version:

ARTICLE IX

Voting

(a) ~~Irrespective of the number of Designated Members designated by a single Government, only one vote may be~~

~~east on behalf of that Government.~~

(b) The following categories of motions require for adoption a two-thirds majority of those voting: motions to alter this Constitution, motions to dissolve the Association, and motions arising during meetings and relating to temporary adjournment, closing of debate, or postponement of action. All other motions require a simple majority of those voting for adoption.

(c) On urgent matters as determined by the Executive Committee, and in which the Executive Committee is not authorised to act, ~~voting members~~ may be requested by the President to vote by correspondence during the period between ordinary meetings of the Association in accordance with paragraph (a) and (b) of this article.

Proposed Version:

ARTICLE IX

Voting

(a) Prior to an Ordinary or Extraordinary Meeting, each Designated Authority shall appoint one Designated Member and each Member Laboratory shall appoint one Delegate. Designated Members and Delegates are entitled to vote in accordance with paragraphs (b) and (c) of this Article. A Designated Member may also be the Delegate for a Member Laboratory.

(b) For all motions relating to modification of the "International Rules for Seed Testing" one vote may be cast by each Delegate and one vote may be cast by each Designated Member.

(c) For all motions other than those relating to modification of the "International Rules for Seed Testing" one vote may be cast by each Designated Member.

(d) The following categories of motions require for adoption a two-thirds majority of those voting: motions to alter this Constitution, motions to dissolve the Association, and motions arising during meetings and relating to temporary adjournment, closing of debate, or postponement of action. All other motions require a simple majority of those voting for adoption.

(e) On urgent matters as determined by the Executive Committee, and in which the Executive Committee is not authorised to act, Designated Members or Designated Members and Delegates may be requested by the President to vote by correspondence during the period between ordinary meetings of the Association in accordance with paragraph (b), (c) and (d) of this article.

Explanation of proposed changes to Article IX

The proposal for change to Article IX (Voting) of the ISTA Constitution is presented with the current version for comparison. The implications of these proposed changes are as follows:

1. For each Ordinary or Extraordinary Meeting of ISTA, a country's DA will appoint a DM to cast the vote of the DA for all motions.

(i) **Question** - How does this differ from the present Constitution?

Answer - There is no change.

2. For each Ordinary or Extraordinary Meeting of ISTA, each Member Laboratory appoints one Delegate who is entitled to cast a vote for all Rules proposals only. A DM may also be appointed as a Delegate.

(i) **Question** - Will DMs still be able to vote (as a DM) on rules proposals?

Answer - Yes.

(ii) **Question** - If a DM is also appointed as a Delegate how many votes will he/she have for any Rules proposals?

Answer - Two; one as the DM and one as the Delegate.

(iii) **Question** - Why let all Member Laboratories have a vote rather than just accredited laboratories?

Answer - It could be argued that the latter should be the case, but if we went for this option we would have a situation where member countries could be disadvantaged regarding Rules proposals because they do not have an accredited laboratory.

(iv) **Question** - Why should some countries have more votes than others?

Answer - A change of mind-set is required here, because this is no longer a country issue but a member laboratory issue. It is proposed that Member Laboratories (who have all paid membership fees to ISTA) should have more say in the running of their Association, and so all Member Laboratories should be entitled to one vote. A Member Laboratory should not be disenfranchised simply because somebody else considers there are too many Member Laboratories in one country.

(v) **Question** - Will the number of members for a quorum need to be increased?

Answer - No, it will and should not be. A quorum is defined as the minimum number of members who must be present at the meeting.

(vi) **Question** - is a change to the paragraph

which sets the quorum (Article X(d)) necessary?

Answer - No. For the meeting to be quorate, the current requirement for Designated Members designated by forty percent of the Designated Authorities to be present will still apply. If this number of DMs is not reached then the meeting does not have a quorum, even if a large number of Delegates are present.

III. 2.) It has been proposed to change Article IV as follows:

Current Version:

ARTICLE IV

Membership

(b) ~~Designated Members are persons and/or laboratories engaged in the science or practice of seed testing or in the technical control of such activities, who are designated by their respective Designated Authority and admitted by the Association to participate in the affairs of the Association.~~

(c) A Member is a person or seed laboratory who/which supports the Association and its objects and is admitted by the Association.

(d) ~~The duly designated Designated Members shall be entitled to vote in the meetings of the Association, subject to the provisions of Article IX.~~

Accredited Laboratory

(e) An Accredited Laboratory is a member laboratory accredited by the Executive Committee according to the Accreditation Standards approved under Article VII(c)(15) of the Constitution.

Proposed Version:

ARTICLE IV

Membership

(b) A Member is a person or seed laboratory engaged in the science or practice of seed testing or in the technical control of such activities, and is admitted by the Association.

(c) A Designated Member is a member appointed by a Designated Authority entitled to vote on behalf of that Designated Authority in accordance with paragraphs (b) and (c) of Article IX of the Constitution.

(d) A Delegate is a personal member employed by a member laboratory and appointed by that laboratory to vote on its behalf in accordance with paragraph (b) of Article IX of the Constitution.

(e) An Accredited Laboratory is a member laboratory accredited by the Executive Committee according to the Accreditation Standards approved under Article VII(c)(15) of the Constitution.

Explanation of proposed changes to Article IV

The proposal for change to Article IV (Membership) of the ISTA Constitution is presented with the current version for comparison. The implications of these proposed changes are as follows:

1. The Designated Member definition has been amended and a Delegate defined.

(i) Question - Why?

Answer - Previously the term Designated Member referred both to persons and/or laboratories. The term "Designated Laboratory" is now obsolete, as in all its work ISTA refers only to Member Laboratories and Accredited Member Laboratories. The revised definition for Designated Member, and the new definition of a Delegate are required for the proposals for change to Article IX (Voting) of the Constitution.

III. 3.) Other Constitution Changes Required if Articles IV and IX are changed

If the proposals for change to Articles IV and IX are accepted at Budapest, then the following Article will, as a consequence, also require amendment:

Article X(e)(3) - Add "and Delegates" after "Designated Members":

New Version if accepted by Voting Delegates under item I. 6.):

ARTICLE X

Meetings of the Association

(e) The agenda for an ordinary meeting of the Association shall include:

- (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) Consideration and adoption of reports.
- (8) Announcement of the place and date of the next ordinary meeting of the Association.
- (9) Any other business raised by a Member, of which notice in writing has been received by the Secretary General at

least two months prior to the date of the meeting.

- (10) Any other business raised by consent of the Executive Committee.
- (11) President's closing address.
- (12) Adjournment.

And additionally at the ordinary meeting held in the third year after the ordinary meeting at which Officers and members-at-large of the Executive Committee were appointed:

- (13) Discharge of the Executive Committee.
- (14) Election of Officers and members-at-large of the Executive Committee.
- (15) Installation of new Officers.
- (16) Fixation of annual subscriptions.

Proposed Version:

ARTICLE X

Meetings of the Association

(e) The agenda for an ordinary meeting of the Association shall include:

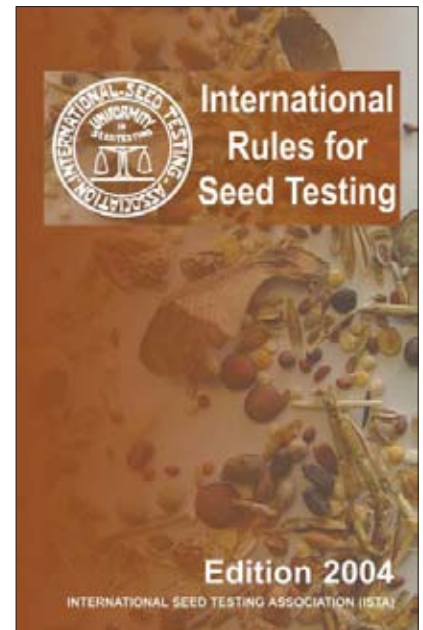
- (1) Call to order.
- (2) President's address.
- (3) Roll call of Designated Members and Delegates entitled to vote.
- (4) Reading and acceptance of Minutes.
- (5) Report of the Executive Committee.
- (6) Report of the Secretary General.
- (7) Consideration and adoption of reports.
- (8) Announcement of the place and date of the next ordinary meeting of the Association.
- (9) Any other business raised by a Member, of which notice in writing has been received by the Secretary General at least two months prior to the date of the meeting.
- (10) Any other business raised by consent of the Executive Committee.
- (11) President's closing address.
- (12) Adjournment.

And additionally at the ordinary meeting held in the third year after the ordinary meeting at which Officers and members-at-large of the Executive Committee were appointed:

- (13) Discharge of the Executive Committee.
- (14) Election of Officers and members-at-large of the Executive Committee.
- (15) Installation of new Officers.
- (16) Fixation of annual subscriptions.

Reason: There will have to be two roll calls, one for DM and one for Delegates. ■

International Rules for Seed Testing - 2004 Amendments



ISTA's primary instrument in promoting uniformity in seed testing procedures is the 'International Rules for Seed Testing', which lays down detailed standard techniques and procedures. The publication includes 17 Chapters and Appendices describing principles and definitions in detail, assisted by many tables and the methods to be used.

The Rules changes were adopted at the Extraordinary Meeting held in Zurich, Switzerland July 2 - 3, 2003. Only the changed pages are included in this package, which is made up of 72 pages. The chapters and pages to be replaced is clearly specified in a table in the preface. The pages from the 2003 Edition that are to be replaced will be no longer valid.

PRICE:
CHF 99.00

Full 2004 Edition available at:
CHF 365.00

Challenges for the production of high quality organic seeds

By Steven P.C. Groot, Jan M. van der Wolf, Henk Jalink, Cees J. Langerak and Ruud W. van den Bulk
Plant Research International, Wageningen University and Research Centre

P.O. Box 16 6700 AA Wageningen, Netherlands,
E-mail: steven.groot@wur.nl



From left to right: Henk Jalink, Steven Groot, Ruud van den Bulk, Cees Langerak and Jan van der Wolf

Important aspects of organic crop production are the abandoning of chemical crop protectants, the use of organic manure instead of chemical fertilisers and the certification of the organic production system.



Figure 1. Seed researcher Steven Groot analysing a germination test

The world-wide need for a more sustainable agriculture has stimulated farmers and consumers to go for alternative production methods, including organic farming. Important aspects of organic crop production are the abandoning of chemical crop protectants, the use of organic manure instead of chemical fertilisers and the certifi-

cation of the organic production system. The latter is important for consumers, in justification for paying higher prices for organic products.

In the European Union the rules for organic production methods are laid down in EEC regulation 2092/91, which exactly states the kind of input and measures that are allowed for organic production, including certification. A prerequisite for organic farming is that seeds or other propagation material should also be produced under organic farming conditions. For several crops, such as potato and tomato, this works quit well. For some other vegetable or arable crops it is very difficult to produce organic seeds using the same quality standards as for conventional farming, while for ornamental crops there is hardly any organically produced propagation material available. Especially with biennial vegetable crops, as cabbages, carrot and onion, difficulties are encountered with production of high quality organic seeds. For these crops, the two seasons needed for seed production make the risk of diseases and pathogen contamination very high. With respect to cereals, organically produced wheat seeds are available, but the emergence of the seeds is often less than that of conventionally produced seeds, which normally is treated with fungicides. *Fusarium* infections are mostly causing this problem. In Denmark, for instance, it is debated whether the threshold for *Fusarium* infection in wheat seed should be increased for organic wheat seed, since it is at this moment not, or hardly, possible to meet the quality standards (B.J. Nielsen, pers. comm.). Moreover, organic seed production

is at this moment often more expensive than conventional seed production, varying from a few percent till three fold, among others due to losses during seed production or insufficient quality of some seed productions (van der Zeijden, 2003). Research is needed to tackle these problems and aid seed companies in improving their organic seed production and seed treatment methods.

The frequent lack of available organically produced propagation material made the European Commission to introduce a temporary derogation system, under which the use of conventionally produced non-chemically-treated propagation material can be allowed. This under the condition that no organically produced seed was available of the variety the farmer intended to grow. The deadline for this derogation system was set at 1 January 2004. Nevertheless, several companies have put large efforts in the optimisation of organic seed production, in several cases with success. In practice, some organic farmers did choose, for economic reasons, a variety for which only cheaper conventionally produced seeds were available. Last year it became apparent that for various crops the supplies of organic produced seeds are still insufficient. The European Commission decided therefore that the deadline for derogation should be postponed again for some crops. Each EU country had to produce a national list of crops for which derogation of the use of organic propagation material is no longer allowed. In the Netherlands this list includes for 2004, for instance, wheat, oat, barley, ryegrass and potatoes, but for some vegetable crops derogations are still allowed. The

ongoing derogations are not stimulating for seed companies to invest in organic seed production.

Next to the difficulties regarding the production and availability of organic propagation material, organic farmers encounter other problems that are less relevant in conventional crop production. Because of the abandoning of the use of chemicals during seed production, organic seed has a greater risk of contamination with weed seeds and seedborne pathogens. Moreover, sowing of seeds in soils with organic manure, that has slower mineralisation rate in the cold spring, and a stronger competition from weeds may require a high seed vigour and seedlings with a faster developing root system. Increased risks of seed contamination with seedborne pathogens might theoretically also increase the risk of crop contamination with mycotoxin producing fungi. However, the few relevant studies in which a direct comparison between organic and conventional crop production systems was made with regard to contamination with mycotoxins, do not support this theory. At present an important sales point is the guaranteed non-GM nature of organically produced products. With a global increase of GMO crops, also in regions of seed production, the risk for GMO contamination also increases. Presently it is discussed at the international level whether organic seeds need lower thresholds for contamination with GMO seeds than non-organic seeds.

At present an important sales point is the guaranteed non-GM nature of organically produced products. With a global increase of GMO crops, also in regions of seed production, the risk for GMO contamination also increases.

These challenges urge for finding solutions, for a large part through research. Adequate methods for the detection of pathogens during seed production and determination of critical control points during production will provide the basis for disease monitoring activities and treatments. New seed sanitation treatments need to be developed as alternatives for the present use of fungicides. These treatments need not only be effective in elimination of the pathogen, but should also maintain the viability of the seeds. Such new treatments should also be in accordance to both the standards for organic farming and (inter)national regulations regarding the use of crop protection agents. Novel seed

sorting techniques may also be of use by sorting out diseased seeds from contaminated lots or discarding less vigorous seeds. At Plant Research International we are involved in a national research programme funded by the Dutch government and in two EC funded projects. In our research we collaborate with the seed industry, organic farmers and policy makers, to guarantee that solutions from research can be implemented in practice. Some examples of this research are presented below.

A healthy organic seed production

A consequence of the omission of chemicals in the organic production system is the increased risk of the occurrence of diseases during production of some crops, as long as disease resistant varieties are not available. This holds also for seed production, especially, for biennial crops, which are exposed to various diseases during two subsequent seasons. To find alternative measures for optimising organic seed production, we focused on gathering knowledge of "thresholds", describing the link between measured seed contamination levels of a pathogen and the potential disease risk in practice. The host-pathogen combination *Daucus carota* - *Alternaria radicina* was chosen as a model. Several field experiments were carried out under organic conditions, using basic seeds of six different cultivars with various levels of *A. radicina*. Disease transmission was studied and measured in all stages of the reproduction chain, from seed to seed. Important hereto is the detection method by which the presence of the pathogen can be demonstrated in basic seed and other kinds of plant material produced from that *viz.*, seedlings, leaves, roots, flower stems, flowers and the second generation seed. To detect also slight infections, we preferred to use the more sensitive ARSA method (Prior *et al.*,

1994) instead of the blotter or malt agar method recommended by ISTA (ISTA, 2003).

Infections found with the blotter method are mainly related to a bad emergence and occurrence of symptoms in the seedling stage and leaf stems. The slight seed infections, which could only be detected with the ARSA method, seem to be responsible for non-visible latent infections in the crown part of the carrot root. These infections may become visible as a black rot either at a high temperature (>20 °C) during maturation of the carrots or during cool storage of the carrots. When young carrot plants or mature roots are vernalised in order to induce flowering, latent infections mostly remain unnoticed. Such infections can finally result in infected flowers and diseased seeds, and may form a source of inoculum for secondary infection of seeds developing on healthy plants.

Organic seed production requires a high degree of sanitation, e.g. disease freedom of the basic seed, roguing in any stage of plant development and a stringent isolation of production fields from other umbelliferae.

Consequently, organic seed production requires a high degree of sanitation, e.g. disease freedom of the basic seed, roguing in any stage of plant development and a stringent isolation of production fields from other umbelliferae. Additional experiments have also shown that a hot water treatment of the basic seed can be a good start for such a protocol (as shown in the graph).

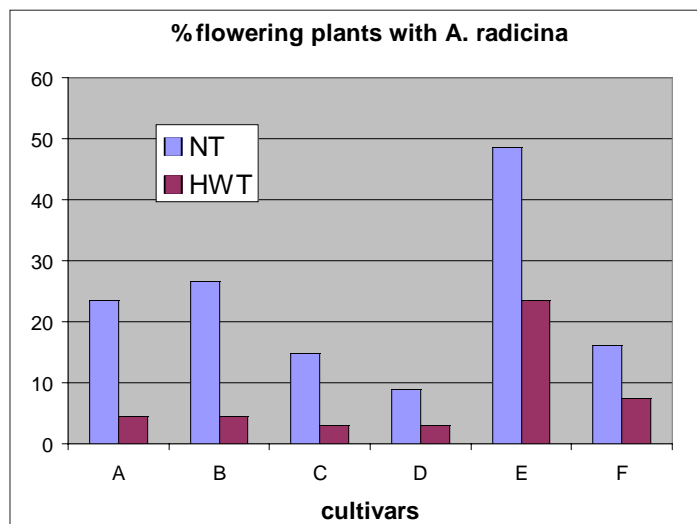


Figure 2. Hot water treatment (HWT) lowers the risk of transmission of *Alternaria radicina* to the flowering carrot plant. NT is the non-treated control

Challenges for the production of high quality organic seeds

Compounds of natural origin for seed treatment

Most commercially produced seed is treated nowadays with (synthetic) crop protection agents, in order to eliminate seedborne pathogens and to protect emerging seedlings from soil- and air-borne pathogens and insects. For organic agriculture physical treatments, such as hot water treatments, are used, but they involve the risk of seed damage. We are developing a combination therapy, by combining milder physical treatments, with treatments using compounds of natural origin.

Within this concept, different natural compounds are tested, including essential oils and organic acids. To evaluate natural compounds for activity against important seed transmittable plant pathogenic bacteria and fungi, we optimised *in vitro* microplate assays. From 30 essential oils tested, thyme oil exhibited the highest *in vitro* inhibiting activity against *Xanthomonas campestris* pv. *campestris* (*Xcc*) and *Clavibacter michigan-*

ensis subsp. *michiganensis*. Thyme oil also showed an inhibiting activity against *Botrytis aclada* and *Alternaria dauci*. Strong synergistic effects were found by adding a chelator and a natural detergent to the oil. Treatment of cabbage seed for 0.5 h with 0.25% thyme oil resulted in a strong decrease of seed-associated bacteria (> 99%) and saprophytic fungi. However, a negative effect on seed germination was found with an oil concentration exceeding 0.25%, when applied for at least 4 h. Ascorbic acid in a concentration of 2.5% also resulted in a strong decrease of seed associated bacteria without affecting seed germination. Presently we are investigating the effect of both types of components on pathogen infected seeds.

Treatment of cabbage seed for 0.5 h with 0.25% thyme oil resulted in a strong decrease of seed-associated bacteria (>99%) and saprophytic fungi.

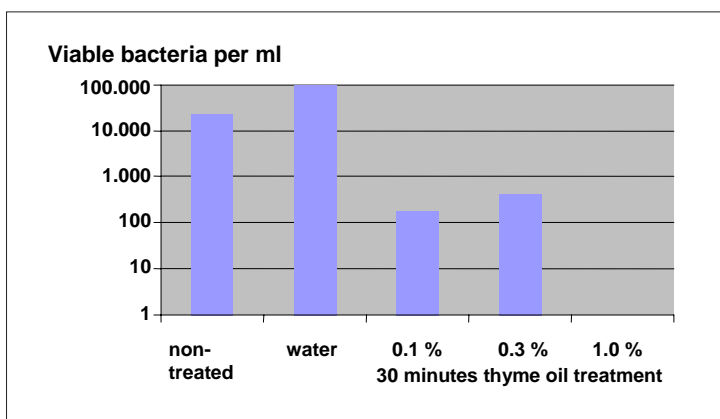


Figure 3. Effect of thyme oil treatment on the bacterial background of a cabbage seed lot



Figure 4. Organic onions growing from primed seeds

An important aspect for implementation in practice is that also the use of these natural agents should be allowed according to the national and international regulations for crop protectants, even if they are already used in food products. Products that are not yet registered for use as a crop protectant will need the submission of new dossiers, often requiring costly toxicological studies that are not feasible for the small market of organic seed treatment. Next to that, they should also be allowed for use in organic production systems (EEC regulation 2092/91).

In the Netherlands thyme oil fits both the criteria and may be used for treatment of seeds when mixed with water. Due to its hydrophobic properties treatments with thyme oil need to be further optimised. The use of ascorbic acid is presently not allowed for organic seed treatments, since it is not listed in annex IIB (EEC regulation 2092/91) describing the crop protection agents allowed for organic production. However, it is permitted as additive in organic food and fodder (annex IIC) and it could be worthwhile to submit a request to the EC to place this compound on Annex IIB as well.

Seed priming

Microbial activity is very important for the release of nutrients, when using organic manure. In the cold spring soil, microbial activity is low and nutrients become less readily available in comparison with the use of synthetic fertilisers in conventional farming. A vigorous seedling with a fast growing root system may improve the uptake of minerals and improve the establishment of the crop. In this respect vigorous, healthy seedlings may be even more important for the organic farmer than for the conventional farmer. Moreover, faster growing seedlings can improve competition with weeds for nutrients and light. The latter is relevant, because manual and mechanic weed removal are major costs in organic farming. We found that primed seeds from onion and carrot had a faster establishment in organic soils compared to non-primed seeds. Two months after sowing, the roots and shoots of plants from primed seeds were larger than of plants from non-primed seeds. In our field tests, however, we had a favourable growing season and the plants from non-primed seeds caught up. As a result there was no significant effect on the yield at the end of the growing season. We expect that under less optimal conditions, for instance when the crop is attacked by diseases during the season, the initial faster growth of primed seeds

can have strong benefits for the organic farmer. Dutch organic farmers will continue experimenting with primed seeds in 2004.

New seed sorting technologies to improve the health and quality of seed lots

As argued above, for organic farmers the use of seed lots with a high vigour may be even more important than for conventional farmers. Also alternative sanitation treatments with, for instance hot water, require a high degree of tolerance of the seeds. Commercial seed lots can be composites of seeds harvested over different periods of time and differing in quality. The environmental conditions constantly change during the production period and add to the heterogeneous nature of the seed lot. During maturation, seeds reach optimal physiological quality. A major cause of the heterogeneity is the variation in maturity, resulting in a seed lot with an overall lower seed quality. Seeds, which are not completely mature, germinate more slowly, have a lower germination capacity, produce less normal seedlings, can have higher contamination levels with pathogens, and can be more sensitive to diseases. In this respect seed maturity has a large influence on seed vigour.



Figure 5. Germination test for CF sorted white cabbage seeds; left low CF, right high CF and bottom control non-sorted seed.

In general, after the filling of the seeds has completed the colour of the seeds slowly turns from green to a colour that varies with the species or cultivar. This process is called degreening, due to chlorophyll breakdown, and is correlated with seed maturation. The maturation of the seed can be distorted by poor plant nutrition, poor weather conditions, the presence of pathogens or an early harvest. These are all factors known to influence seed vigour. Seed companies use different types of sorters, including colour sorters, for upgrading of their seed lots. However, the colour of high quality mature seeds may vary, because the colour is not only influenced by breakdown of chlorophyll but can also depend on the presence of other

pigments, related to the cultivar and production conditions. It is known that chlorophyll shows prompt fluorescence when the molecule is excited at the proper wavelength. The established chlorophyll fluorescence (CF) sorting method analyses the amount of chlorophyll in the seed by measuring the chlorophyll fluorescence signal in a very sensitive manner (Jalink *et al.*, 1998). Using CF sorting, one measures the intensity of CF signal of each individual intact seed at high speed. Based on the magnitude of the chlorophyll fluorescence signal, the seeds can be sorted into various classes of maturity and linked to seed performance. Cabbage seeds with the lowest amount of CF, and hence the most mature, provide indeed the highest percentage of germination, a more uniform germination, a higher speed of germination, a higher percentage of normal seedlings, and a lower amount of pathogens. Seeds from the high CF fraction, involving less mature seeds, showed a lower germination capacity and were more heavily infected than the seeds from the low CF fraction (Jalink *et al.*, 1998).

Cabbage seeds with the lowest amount of CF, and hence the most mature, provide indeed the highest percentage of germination, a more uniform germination, a higher speed of germination, a higher percentage of normal seedlings, and a lower amount of pathogens.

Also for barley (*Hordeum vulgare* L.) seeds, a relationship was established between the CF signal and the level of contamination with *Fusarium* spp and *Cochliobolus sativus* pathogens (Konstantinova *et al.*, 2002). Seeds from the fraction with the highest CF signals were always the most heavily infected. CF sorting of barley seeds improved their germination quality by not only removing less mature seeds, but also by removing seeds with the largest fungal infection levels. This technology can therefore also contribute to improving the quality of organic seeds.

International collaboration

The need for a more sustainable agriculture is acknowledged world-wide and many governments support research for organic farming. Seed companies also invest in organic seed production, in spite of the general expectation that the organic seed market is hardly interesting for the main seed companies from a commercial point of view.

Many governments support research for organic farming. Seed companies also invest in organic seed production.

Collaboration between private and public institutions is a must, both on the national and international level.

Collaboration between private and public institutions is a must, both on the national and international level. As seeds are the basis of crop production, it is an important that the International Federation of Organic Agricultural Movements (IFOAM), the Food and Agriculture Organisation of the United Nations (FAO) and the International Seed Federation (ISF) have taken the initiative to organise together the 'First World Conference on Organic Seed'. This conference will take place from 5-7 July 2004 at the FAO Headquarters in Rome. As key player in the research on and analysis of seed quality, ISTA will also take part in this conference. ■

References

- ISTA, 2003. International Rules for Seed Testing, Annex to chapter 7, Seed Health Testing Methods: 7-002a/b Blotter and malt agar method for the detection of *Alternaria radicina* on *Daucus carota*.
- Jalink, H., R. van der Schoor, A. Frandas, J.G. van Pijlen & R.J. Bino (1998). Chlorophyll fluorescence of *Brassica oleracea* seeds as a non-destructive marker for seed maturity and seed performance. *Seed Science Research* 8: 437-443.
- Konstantinova, P., R. van der Schoor, R. van den Bulk and H. Jalink (2002). Chlorophyll fluorescence sorting as a method for improvement of barley (*Hordeum vulgare* L.) seed health and germination. *Seed Sci. Technol.* 30: 411-421.
- Prior, B.M., R.M. Davis and R.L. Gilbertson, 1994. Detection and eradication of *Alternaria radicina* on carrot seed. *Plant Disease* 78: 452-456.
- Van der Zeijden D. 2003. The economics of Bejo's organic seed programme. In: *Organic Seed Production and Plant Breeding - Strategies, problems and perspectives. Proceedings of ECO-PB 1st International symposium on organic seed production and plant breeding*, Berlin, Germany 21-22 November 2002, (Eds. E.T. Lammerts van Bueren and K-P. Wilbois): pp 55-58.

Workshop in the Detection of Genetically Modified Crops

ARC-Roodeplaat, Pretoria,
South Africa,
November 10 - 14, 2003

By **Graham Thompson**, Director of UNESCO/BAC BETCEN, Africa, **Gurling Bothma**, Course Coordinator, ARC-Roodeplaat VOPI, and **Christoph Haldemann**, ISTA GMO Task Force Member



Aim

The aim of this course was to train scientists from African countries to use standardized methods to test for the presence (or absence) of genetic modification in plant tissue (i.e. crops) using various PCR techniques.

Introduction

Governments are regularly confronted with organizations questioning the ethics, safety and environmental effect of GM foods. Recently the issue made international headline news when certain countries refused food aid, as there was no guarantee that it was not genetically modified. It is in the interest of the general public to verify that certain foods are safe even though they may be derived from GM crops. It is therefore important that scientists be trained to be able to detect the presence or absence of GM material.

GM foods are developed and marketed because there is some perceived advantage either to the producer or the consumer of these foods. This is meant to translate into a product with a lower price, greater benefit (in terms of durability or nutritional value) or both. Initially GM seed developers want their products to be accepted by producers so have concentrated on innovations that farmers (and the food industry more generally) would appreciate. The initial objective for developing plants based on GM organisms was to improve crop protection. The GM crops currently on market are mainly aimed at an increased level of crop protection through the introduction of resistance against plant diseases caused by insects or viruses or through increased tolerance towards herbicides.

The movement of these genes from GM

plants into conventional crops or related species in the wild (referred to as out-crossing), as well as the mixing of crops derived from conventional seeds with those grown using GM crops, may have an indirect effect on food safety and food security ⁽¹⁾. This risk is real, as was shown when traces of a maize type, which was only approved for feed use, appeared in maize products for human consumption in the United States of America. Several countries have adopted strategies to reduce mixing, including a clear separation of fields within which GM crops and conventional crops are grown ⁽²⁾.

Despite the ongoing debate on GM crops, particularly in countries of the European Union, millions of large and small-scale farmers in both industrial and developing countries continue their plantings of GM crops in consecutive years because of the significant multiple benefits they offer. This high adoption rate is a strong vote of confidence in GM crops, reflecting farmer satisfaction. This also puts pressure on laboratories to be even more accurate on testing GM material.

Currently ISTA has taken the responsibility on itself to work towards ensuring that seed testing laboratories are competence centres for varietal purity testing of GM varieties as well as for the detection, identification and quantification of GM seeds in conventional seed lots and provide uniform test results all over the world. ISTA is presenting workshops on varietal verification and GMO testing around the world with great success. These workshops are a major tool to assist ISTA in transferring technology from one laboratory to another and from the researchers' bench to facilitate the International trading of seed of improved varieties of agricul-

tural, horticultural and vegetable crops and forest tree seed. Dramatic gains are made in plant breeding through the application of genetic engineering techniques. Dramatic advances are also being made in the development of tests and techniques to monitor and identify macromolecules directly and indirectly. The need for test method quality assurance protocols has been highlighted over the past few years as laboratory results are increasingly challenged in the courts.

It is therefore extremely important to get scientists trained to use the most up to date methods so that they can be applied without any delay should some controversy arise over the presence/absence of GMO food.

The Biotechnology Action Council (BAC) of UNESCO established a Biotechnology Education and Training Centre (BETCEN) for the African Continent in 1995 at the Roodeplaat Vegetable and Ornamental Plant Institute of the Agricultural Research Council in Pretoria, South Africa. The BETCEN has played a major role by training over 200 Plant Biotechnologists from 23 countries since 1995. In the past this was the only institution in Africa providing "hands on" plant biotechnology training over a wide range of techniques (Plant Tissue Culture, Plant Molecular Biology, Transformation and Molecular Markers). Additionally BETCEN participants have also been exposed to the management of biotechnological projects, the establishment of infrastructure (Tissue Culture Labs), statistical methods, the Internet as well as successful networking in Africa.

Training in Biotechnology for African Scientists is essential for the development of

sustainable agricultural systems designed for Africa. The use of genetically modified foods is gaining acceptance in many communities throughout the world. It is crucial that scientist become familiar with the techniques used in plant biotechnology. It is also important for "hands on" experience when learning these.

The Workshop

Course candidates from the Southern African Region (as specified by the UNESCO Regional Office) were selected based on their scientific background, active involvement in Biotechnology and their expressed interest in the field of GMO detection. The course was advertised in the region and application forms were sent to Institutions that are presently active in the field of Biotechnology

The ARC-Roodeplaat / BETCEN is situated on the Roodeplaat Experimental Farm complex ±30 km northeast of Pretoria on about a 3000-hectare area of land. This includes 3 Institutes of the ARC. The complex includes laboratory facilities. The ARC-Roodeplaat/ UNESCO BETCEN Faculty hosted the course.

25 formal applications were received and 10 participants were selected, while 4 participants were self funded. ISTA approached Dr Christoph Haldemann, ISTA GMO Task Force member and personal member of ISTA, to see if he was willing to run the workshop, which he was. The programme was planned in conjunction with Dr Christoph Haldemann. Facilities were prepared and equipment and reagents procured. Venues, catering, transport and accommodation were arranged as needed.

A five-day workshop was conducted. The workshop consisted of practical and theoretical components. A visit to the GMO testing laboratory at CSIR, Pretoria, was also arranged. Three PCR techniques were used in the practical components, namely; standard PCR, Competitive PCR and Nested PCR. Real time PCR methodology was demonstrated at the laboratories of CSIR. Each participant received a workshop manual as well as a CD which contained the workshop manual, all the lectures, a review article, calculations, cyler profiles, primer sequences, RAP - detection techniques used for food, feed and seeds and the BATS: Genetically Modified Crops: molecular and regulatory details.

References

- 1) Africa analytical reporter (2003) 3: 30.
- 2) Kuza Advancing Agriculture in Africa (2003)

2nd International Conference "Healthy Seed for Healthy Crop" 16-18 September 2003, Poznan, Poland

By Krystyna Tylkowska, ISTA Member and Malgorzata Manka



The Seed Pathology Section of the Polish Phytopathological Society has been working actively for the past 20 years, chaired from the beginning by Dr Krystyna Grzelak and more recently by Dr Elzbieta Zakrzewska. After a series of conferences and symposiums in Poland and editing the bibliography of Polish papers on seed pathology (<http://www.au.poznan.pl/ptfit/sekcje/bibliografia>) the first international conference entitled SEED HEALTH AS QUALITY CRITERION was organized in 2000 in Radzików near Warsaw, in cooperation with Plant Breeding and Acclimatization Institute (IHAR).

The second international conference on HEALTHY SEED FOR HEALTHY CROP was organized in cooperation with the August Cieszkowski Agricultural University on 16-18 September 2003 in Poznan. The conference was financially supported by the State Committee for Scientific Research, Germain's Technology Group and the Main Inspectorate of Plant Protection and Seed Inspection Service. Sixty four participants representing agricultural universities, research institutes, plant protection and seed inspection services, chemical and seed companies, seed technology group, and state forest units from 9 countries attended the conference.

Oral (19) and poster (25) presentations highlighted the following main topics:

- Seed-pathogen-environment relationships
- Quarantine and certification as a tool to minimise distribution of seed-borne pathogens
- Methods for detection of seed-borne pathogens
- Toxicogenicity of seed-borne fungi
- Seed treatments
- Pathological aspects of seed storage
- Tree seed pathology

Invited papers focused on: Plant Protection and Seed Service in Poland - organization and tasks (M. Wasowska, J. Zandarski); Traditional and innovative methods to detect seed-transmitted pathogens (C. Cappelli, R. Buonario); Fungi and their mycotoxins in seeds - risk for humans and animals (P. Golinski, I. Kiecana, K. Tylkowska, J. Grabarkiewicz-Szczesna); Biocontrol of seed-borne diseases (I. M. B. Knudsen, B. Jensen, K. Thomsen, D. F. Jensen); "Electronic noses" and their application in detection and differentiation of microorganisms (H. Jelen); Seed-borne diseases of forest trees and shrubs - a review (Z. Procházková).

A visit to the Institute of Dendrology of the Polish Academy of Sciences (Kórnik near Poznan) allowed the participants to get acquainted with research on tree seed science and technology carried out there.

The next conference will be held in Bydgoszcz and Torun in 2006.

SEEDSCANNER 2003

Automatic seed analyser using the latest technology to dramatically reduce the manual work in the **determination by number of other seeds** in cereal species and improve your staff's working environment. Three machines are already in operation in seed certification



Does everything have to be done manually?

We can reduce the work in a round-the-clock operation and create a more friendly and efficient environment for your staff.

Meet us in the exhibition hall at the ISTA 27th Congress in Budapest, Hungary

The species included in the programme are wheat, barley, oats, rye and triticale.

The operation starts with a calibration phase, which can be used for further samples. Seeds are imaged individually (9-12 seeds/sec) and separated into accepted and suspect fractions using a computerised system. All seeds are counted, and the 1000-seed weight is calculated.

Only 5-10% of the original sample (the suspect fraction) requires visual inspection. The accuracy of separation is 99%.

Thirty samples, each 1 kg capacity, can be loaded and analysed in 35-50 min/each in a round-the-clock operation. Samples can be loaded and unloaded without interrupting the work of the separation unit. A robot handles the samples and the containers in the machine.

Samples are treated gently, avoiding any change in the nature of the original samples. The machine has a self-cleaning function and a low noise level, and has been designed to meet quality assurance requirements. It requires normal cleaned seeds. For environmental reasons, chemically treated samples are not recommended.

Seedscanner 2003 complies with EC mechanical and electrical safety standards and can be connected to a local area network for control and statistics.

For more information contact:

maxx automation ab

**Alsikegatan 4
SE-753 23 Uppsala, Sweden**

**phone: +46 18155560
email: jlp@elektronik.st**

**fax: +46 702244126
web: www.maxx.se**

Healthy seeds, the basis for sustainable farming



Paper Series from the 4th ISTA PDC Symposium on Seed Health

Wageningen, Netherlands,
April 29 - May 1, 2002

The ISTA Seed Health Committee continues with the new series in the *Seed Testing International*. The two papers 'Strategies for regulation of seed borne diseases in organic farming' by Anders Borgen, Scanagri Denmark, Denmark and 'Early harvest - a possible method for production of healthy seed for organic farming' by Hans Olvang, Swedish University of Agricultural Science, Sweden are the second in a series of papers related to the field of seed health and show the technical and scientific work of our association.

The papers are works which were presented at the 4th ISTA-PDC Seed Health Symposium 'Healthy seeds, the basis for sustainable farming' held in Wageningen, The Netherlands, April 29th to May 1st, 2002.

The ISTA-PDC Symposia are used as a platform to exchange ideas, new techniques, and information in the various topics of seed health. The high profile of seed health will be reflected in the future presentations in this series covering regional seed health issues, quality management, and innovations and new methods in seed health testing.

Strategies for Regulation of Seed Borne Diseases in Organic Farming

By Anders Borgen, Scanagri Denmark

Scanagri Denmark A/S, Vester Farimagsgade 6, 5th, DK-1606 Copenhagen V., Denmark.
E-mail: anders.borgen@scanagri.dk

Summary

The impact of seed borne diseases on organic cereal production in North-Western Europe is discussed as well as the potential of the possible control measures. It is concluded that it is essential for the organic seed production to put more focus on the control the seed borne diseases. Possible control measures exist, but only a few are used at present. Small seeds are statistically more infected by a number of seed borne diseases than larger seeds. Removal of these seeds by size and gravity separation could be used more frequently. Varieties resistant to the most significant seed borne diseases are available, and improved heat treatment techniques are being developed and are likely to be available for practice in the coming years. Some organic certifying bodies allow application of copper-salts and bio-agents, but the use of these does to some extent conflict with the fundamental principles of organic diseases management.

Introduction

Through agriculture's history, seed borne diseases have been one of the most serious problems in cultivation. From ancient Greece and Rome and until the start of this century control of bunt diseases in cereals, in particular, has played an important role in the history of phytopathology. The development of organic mercury seed dressings in 1913 radically changed this situation within only a few decades. The mercury seed dressings were effective against most of the seed borne diseases - they were not costly and they were easy to use. By the end of the century the use of mercury dressings were prohibited and replaced by other disinfectants.

Many diseases can be transmitted both by seeds and through soil. In the end of last century as crop rotations became less diversified a range of seed borne diseases became more frequent. Also organic farming has become increasingly widespread and this cropping system rejects the use of conventional disinfectants. Organic farmers therefore now face similar challenges as farmers in previous centuries.

The rules applying to organic farming are

based on a number of principles and the organic farming sector does not wish to simply replace the existing chemical agents with other agents from the organic positive list in Annex IIB in the EU regulation (EU 2000). In organic farming, pests and diseases should be dealt with through prevention rather than treatment. In the EU regulation this has been formulated in a way so that the agents listed in Annex IIB can only be used in case of acute risk to the crops. The regulation of seed borne diseases must, thus, be based on a systematic preventive strategy in the production of seeds combined with monitoring of the occurrence of diseases. Direct control must be limited to cases where diseases have been identified despite the preventive actions taken.

Preventive Methods

The most effective preventive method for control of seed borne diseases is to only introduce healthy seed into the system. Normally, organic seeds are produced by purchasing conventional non-treated seeds (C1), which have been grown organically for one season and then sold on to organic farmers as organic seeds (C2). It is of vital importance that the seeds purchased are free from diseases - this is not automatically the case even though it has been grown on the basis of disinfected plant material. Seed borne diseases occur equally often in conventional non-treated seed as in certified organic seed.

The choice of resistant varieties is also an important component in the preventive strategy. Loose smut of barley (*Ustilago nuda*) is mainly controlled by resistant varieties and in Sweden Stava is, thus, grown as the predominant winter wheat variety. This variety is resistant to common bunt (*Tilletia tritici*) and dwarf bunt (*Tilletia contraversa*), which are the most serious seed borne threats to this crop. To a large extent leaf stripe of barley (*Pyrenophora graminea*) and could also be controlled by choosing resistant varieties.

No cereal variety is, however, completely resistant to all diseases - this would probably also be contrary to the wish of maintaining biodiversity. All things considered, it will be advantageous to use mixtures of several varieties, but this strategy is difficult to implement in the multiplication phase of the

propagation, due to practical reasons as well as due to the degree of purity required by the rules for certification of seed.

The cultivation conditions influence the occurrence of seed borne diseases, but we only have limited knowledge of this. It has been stated that row cropping may reduce the impact of some diseases, but the importance of this has not been determined (Borgen, 2001). Also early harvesting has an influence on some diseases (Olvång and Poulson, 2002).

Analysis Methods and Thresholds

In order to assess whether or not there is a need for seed treatment to control diseases, the seed has to be subjected to a phytopathological analysis. The method used for this analysis depends on the types of diseases investigated. Some of the analyses require up to two weeks. In winter cereals, where the time span from harvesting of the crop to the sale and sowing of the seed produced is very short, the considerable time required for analysis is a serious problem. For this reason, in particular, actions have been initiated in many countries focussing on the implementation of new and less time-demanding PCR analysis methods. The methods used until now for the analysis of glume blotch (*Stagonospora nodorum*) and seedling blight fungi (*Fusarium* spp., *Bipolaris sorokiniana*) have, to some extent, been dependent on the laboratory assistant's own evaluation of the differences in colour of roots and grains when applying ultraviolet reflection. Considerable differences have, thus, been registered in the results from the various laboratories. The PCR technology is much more reliable, objective and quick. On the other hand, it is species-specific, which is a disadvantage compared to the traditional analysis of the seedling blight fungi, where many different pathogens are concerned. The implementation of the methods and the evaluation of pros and cons will be investigated in a new research project, which is being carried out in Denmark and will last until 2005.

When the seed has been analysed, the results are evaluated. In conventional farming, thresholds have been developed i.e. guidelines on when dressing may be omitted. These thresholds have been applied until now also within organic farming as an indication of what is acceptable. The thresholds have, however, been determined based on the assumption that e.g. leaf blotch diseases (*Pyrenophora teres* and *Stagonospora nodorum*) can be treated through spraying with fungicides later in the season and that weed can be controlled by using herbicides in cases where the competitiveness of the weed

has been improved in a thin plantation as a result of seedling blight. In organic farming where herbicides and fungicides are not used, the tolerance may, therefore, vary from conventional farming. This aspect will also be dealt with in more detail in the ongoing research project in Denmark.

Control

If the threshold is exceeded in a certain seed lot, action will be required and several possibilities are available. In the other Scandinavian countries Cedomon can be used for the control of seed borne diseases in barley, whereas this agent has not been approved yet for use in Denmark. In winter cereals and in pulse no means of control are used, at present, and consequently all organic seed lots exceeding the threshold are discarded. In some years up to 90% of the seed lots of certain crops have been discarded, which is naturally a totally unacceptable situation for the organic seed production.

The control of seed borne diseases is of vital significance for the organic production. There is a need for developing new methods for prevention, monitoring and control and more qualified thresholds are required.

Removal of the smallest seeds in a seed lot may, in some cases, limit the content or the significance of seed borne diseases. A series of diseases attack, in particular, the top grains in the ear and these are statistically smaller than the remaining grains. The attack itself often also results in a reduction in size of the infected grains. It is, therefore, possible to reduce the impact of the attack of diseases such as loose smut (*Ustilago nuda*), glume blotch (*Stagonospora nodorum*), leaf stripe (*Pyrenophora graminea*) and *Fusarium* by removing the smallest grains of a particular seed lot.

In the case of attacks of common bunt (*Tilletia tritici*) in wheat and stem smut (*Urocystis occulta*) in rye, the spores are placed loosely on the surface of the grains. The grain is as such healthy and not infected until germination. The spores can be removed by means of physical treatment using a brush cleaner of the type used in the production of grass seed. A Sigma cleaner where the grains are centrifuged at high speed is also efficient. These rough treatments will remove dust and hairiness from the grains and thereby also a great part of the fungal spores on the outer side of the grains. It is probably not possible to remove all fungal

spores, but, in some cases, it will be possible to reach a level below the threshold.

Cereal and fungal spores tolerate a good deal of heat when dry, however, much less the moister they are. This factor can be used in to the control fungal diseases. If the grains are exposed to dry heat, the outer parts of the grains will dry out before the inner parts. As most of the fungus is found on or in the outer layer of the seed, the fungus tolerates dry heat better than the germ of the grains, which are better protected. On the other hand, if the grains are exposed to hot water or warm moist air, the outer parts and thereby also the pathogens will become moist before the interior part of the grains. It is, therefore, possible to control a range of pathogens selectively without harming the germination of the grains.

Since the end of the previous century hot water has been used for controlling seed borne diseases, but the traditional hot water method where the grains are sub-merged in hot water is costly and complicated especially in the case of large quantities of cereals, which will require drying afterwards. This method is therefore now only used in certain crops with small and high value seeds.

Several institutions, therefore, concentrate on the development of different types of equipment for thermal treatment of seed in which the imbibition of the seed during treatment is reduced compared to the traditional submersion of the grain into water. At Göttingen University in Germany experiments are carried out using a combination of vapour and microwaves (Cwiklinski et al. 2001); at SLU in Sweden hot air with high air humidity has been tested (Forsberg 2001) and at PlanteForsk in Norway experiments are made with vapour treatment. In Denmark experiments based on this technology will also be carried out in the coming years using the so-called roller drum driers.

Thermal treatment is able to control all relevant diseases in cereal, but the various types of loose smut (e.g. *Ustilago nuda*) requires several hours' of treatment in order to be efficient (Winkelmann 1955) - therefore, it will probably not be economically justifiable to use this technique for these particular types of diseases.

In Germany experiments have been carried out during the last decade on the development of an irradiation installation, which irradiates the grains with electro-rays of the same type as those used in television tubes. This technique has been applied to a limited extent and seems to be able to control a series of diseases. The installation itself requires a considerable investment, which is

only justifiable in the case of high capacity seed installations (>6,000 t/y) (Scröder et al. 1998).

Various seed dressings, which are permitted in organic farming, have been developed. In Germany Tillecur which is based on e.g. mustard flour is used. This agent is very effective against common bunt (*Tilletia tritici*) (Borgen and Kristensen 2001, Spiess 2000). In Denmark it is not permitted to use mustard as seed dressing as it is not listed in Annex IIB in the EU Regulation on organic farming. In Germany, however, the same regulation is interpreted differently allowing the use of mustard flour.

Experiments with vinegar as dressing have been carried out in organic farming and has proven to be effective against common bunt (*Tilletia tritici*) and leaf stripe (*Pyrenophora graminea*) (Borgen and Nielsen 2001). Due to the present interpretation of the EU regulation this agent is, however, not permitted either.

Biological treatments with bacteria or fungi are a potential mean of control. At present no organism or products are approved in Denmark, but in other countries products like Cedomon (*Pseudomonas chlororaphis*) and others can be used. In the coming years it is likely that more products will be approved, and these confirm with the EU regulation on organic farming.

The use of biological control of pathogens in organic agriculture implies a dilemma. On the one hand it is a pesticide-free control measure that promotes beneficial life-forms rather than actively kills pathogens. On the other hand there may be problems connected to the use of some biological control forms parallel to problems related with pesticides. In organic agriculture e.g. plants juices can be used in plant protection, but single chemical compounds isolated from plants or copies hereof are unwanted because they are not used in the concentration and in a chemical and organic environment of which they naturally occur. In the same way the use of a single or a very limited number of micro-organisms may disturb the existing balance in the soil flora, and the use of non-indigenous species not already present in the local soil is certainly questionable in organic agriculture (Borgen and Davanlou 2000). Nevertheless, bio-agents are listed in Annex IIB in the EU regulation and are accepted by a range of certifying bodies in Europe.

Milk powder can be used to control common bunt (*Tilletia tritici*), but a full control can only be reached at doses, where also the germination vigour of the seeds are reduced (Borgen and Kristensen, 2001). However,

milk powder may play a role in combination with bio-control agents, where the effect of both measures is improved by a synergistic effect (Borgen and Davanlou 2000).

In some EU countries copper-salts are used as seed dressing in organic farming. Copper as a seed treatment is quite effective and have been used in Europe for 200 years. However, the use for plant protection in organic farming is controversial. Most wine producing countries allow the use, while the Scandinavian and some other countries have opposed the use of copper in organic farming - therefore, the future of this agent in organic farming is uncertain.

Synthesis

The control of seed borne diseases is of vital significance for the organic production. There is a need for developing new methods for prevention, monitoring and control and more qualified thresholds are required.

In barley leaf stripe (*Pyrenophora graminea*) is the most serious disease. Effective sources of resistance are available against this disease, but there is often a lack of knowledge of which varieties are resistant and which are not. Removal of the smallest grains will reduce the frequency to a certain extent, but in non-resistant varieties, there will be a need for control. Cedomon can be used for this purpose and within a few years thermal treatment will probably also be an alternative. Net blotch (*Pyrenophora teres*) and scald (*Rhynchosporium secalis*) are often found in varying degrees, but it has not been established exactly what effect the seed borne infection has on the development of epidemics. Normally, seed analysis does not include scald. If the tolerance with respect to net blotch is exceeded, Cedomon and thermal treatment may be a possibility. Seedling blight fungi (*Fusarium*, *Bipolaris sorokiniana*) only seldom presents a problem in spring cereal in Denmark. If the threshold is exceeded a removal of the smallest seed fraction may solve the problem.

In winter wheat common bunt (*Tilletia tritici*) is the biggest problem. The variety "Stava" is resistant and is grown in organic farming in Sweden to a large extent. Several resistant varieties are expected on the market in the nearest future. If the threshold is only exceeded to a small extent, treatment by means of brush cleaner or Sigma cleaner may be an alternative. In some years glume blotch (*Stagonospora nodorum*) may harm the germination and possibly activate an epidemic if the proper climatic conditions are present. Removal of the smallest seed fraction may, in some cases, solve the problem by removing the most infected grains. Thermal treatment may, when more develop-

ped, be used in the future.

In rye there are seldom problems with seed borne diseases. Seedling blight fungi may occur, but often the germination will be reduced at the same time - the problem is, thus, not solved even though the pathogens are killed. Stem smut (*Urocystis ocutta*) may occur, but only rarely develops into a problem in the cultivation. The spores may be removed in a similar way as for bunt spores in wheat. Thermal treatment is also a possibility, if the technique is available.

Triticale may, in principle, be attacked by both common bunt and stem smut. However, most varieties are resistant to both diseases. Triticale is a relatively new crop and it cannot be excluded that virulent races of these pathogens develop. The major problem with triticale is, however, seedling blight fungi. Increasing seed size and, in the future, thermal treatment and biological agents offer good possibilities of control.

In oat seed borne diseases are seldom a problem in Denmark, but the crop may be attacked by loose smut (*Ustilago avena*), leaf spots (*Drechslera aenae*) and seedling blight, which can be controlled according to the same principles as used for other crops. ■

List of References

- Borgen, A. 2001:** Regulering og bekæmpelse af udsædsbårne sygdomme i økologisk korn og bælgssæd. In: Vidensyntese økologisk sæsæd. Ed: Nielsen, B. and L. Kristensen. FØJO-report.
- Borgen, A. and L. Kristensen 2001:** Use of mustard flour and milk powder to control common bunt (*Tilletia tritici*) in wheat and stem smut (*Urocystis ocutta*) in rye in organic agriculture. In: Seed treatment - challenges and opportunities (ed. A.J.Biddle) p. 141-150.
- Borgen, A. and Nielsen B. J. 2001:** Effect of seed treatment with acetic acid for control of seed borne diseases. Proceedings from BCPC Symposium No. 76: "Seed Treatment: Challenges & Opportunities", eds. A. J. Biddle. BCPC, Farnham, 135-140.
- Borgen, A. and M. Davanlou 2000:** Biological control of common bunt (*Tilletia tritici*) in organic farming. Journal of Crop Production 6(5):159-174
- Cwiklinski, M., D. von Hörsten, W. Lücke, and G. Wolf 2001:** Alternativen zur chemischen Beizung. Saatgutbehandlung mit Mikrowellen- und Hochfrequenzenergie. Landtechnik 56(1):28-29.
- EU 2000:** Regulation no. 2092/91 on organic agricultural methods and reference hereto on agricultural products and foodstuff. 1991 with later amendments.
- Forsberg, G. 2001:** Värmebehandling - et realistiskt sätt att uppnå friskt ekologiskt utsäde. Proceedings fra konferencen Ekologiskt Lantbruk, Ultuna 13-15/11
- Olvång, H. and P. Person 2002:** Early harvest a possible cultivation measure to improve seed health in organic farming. Seed Testing International 127, 39-42
- Schröder, T. O. Röder and K. Lindner 1998:** E-dressing - a unique technology for seed. ISTA News Bulletin. 118:13-15.
- Spiess, H. 2000:** Aktuelle Versuchsergebnisse zur Weizensteinbrandbekämpfung. Lebendige Erde 5:41
- Winkelmann, A. 1955:** Untersuchungen zur Bekämpfung des Gersten- und Weizenflugbrandes. Angewandte Botanik 29:3-13

Early Harvest - a Possible Method for Production of Healthy Seed for Organic Farming

By Hans Olvång, Dept. of Ecology and Crop Production Science, Swedish University of Agricultural Science

Dept. of Ecology and Crop Production Science,
Swedish University of Agricultural Science,
S 750 07 Uppsala, Sweden.
E-mail: hans.olvang@evp.slu.se

Summary

Samples of kernels of spring barley and spring wheat were collected at different times prior to normal combine harvest in fields at organic farms in the vicinity of Uppsala, Sweden. The seed health was assessed by an osmo-analysis for infestation by *Drechslera teres*, *Bipolaris sorokiniana* and *Drechslera tritici-repentis* and by sowing in soil. It was found that a considerable increase in seed infestation, particularly by *B. sorokiniana* occurred during a three-week period before harvest. Also the frequency of plants that emerged with primary leaf symptoms and discoloured coleoptiles/stem bases increased during this period. The germination of early harvested kernels was not reduced when sown in soil in greenhouse experiments. The water content in the kernels of samples taken 15 days before combining was normally below 35%. It is therefore suggested that a harvest 15 days earlier than normal would improve the health of seed for organic farming.

Introduction

In Sweden the derogation for the organic seed to be produced organically was supposed to end in the year 2000. However, it was later prolonged until 2003. There was a fear that there might be problems in producing seed with a low infestation by plant pathogenic-fungi suitable for organic farming. In Sweden there are limits for seed infestation in order to be certified without proper seed treatment. At present only the bacterial based "Cedomon" (*Pseudomonas chlororaphis*, BioAgri AB, Uppsala, Sweden) is available for seed treatment of organic seed.

In earlier investigations it was noticed that some fungi seemed to infest the cereal seed at a rather late stage of the plant development. For this reason investigations of the seed health at different times before normal combine harvest of spring barley and wheat was started in 1997 in order to find out if it was possible to produce seed with low seed infestation by early harvest.

Material and methods

In 1997 - 1999 approximately ten spring barley and five or six spring wheat fields were assessed each year at organic farms in the vicinity of Uppsala, Sweden. Information on seed health, sowing date, crop rotation and soil management was collected from all the fields. Primary attack by *Drechslera teres* (Sacc.) Shoemaker and *Bipolaris sorokiniana* (Sacc.) Shoemaker was counted at the 2-3-leaf-stage. The amount of necroses caused by leaf-spot fungi was assessed three or four times during the growing season. During ripening, samples of ears yielding from 300 - 500 g of kernel were randomly taken from the same area in each field. The intention was to collect samples 10 and 20 days before estimated combine harvest and from the harvested grain. The samples were protected to minimise water loss and weighed as soon as possible in order to determine the water content of the kernels. They were then air dried at room temperature, threshed and cleaned by hand and stored at room temperature until assessed for seed health.

It was found that a considerable increase in seed infestation, particularly by *B. sorokiniana* occurred during a three-week period before harvest.

The germination of early harvested kernels was not reduced when sown in soil in greenhouse experiments.

It is therefore suggested that a harvest 15 days earlier than normal would improve the health of seed for organic farming.

The kernels were analysed with a modified osmo-method (Joelsson, 1983). Four x 50 kernels were placed on thick filter paper (Munktells, 1731) soaked in a sugar solution (150 gL⁻¹) in transparent plastic trays with lids. In order to get good contact between the kernels and the filter papers, they were punched with a special press to make small

grooves in the papers. The trays were kept seven days at 25°C with illumination by fluorescent/NUV (360 µM) light 12 h day⁻¹. The trays were analysed under NUV light (360 µM) and kernels surrounded by orange fluorescence were assessed as infested by *D. teres* or by *Drechslera tritici-repentis* (Died.) Shoemaker respectively. They were also inspected under microscope for the occurrence of conidia of *B. sorokiniana*.

Kernels were also grown in soil in order to determine plant-pathogenic-fungi. In a sand-mixed peat-moss planting soil, 4 x 50 kernels were sown in shallow 20-cm pots. The pots were placed in the dark at 6°C for 10 days and then moved to a greenhouse (approx. 20°C) for another three weeks. Plants then at the 2-3-leaf stage were carefully pulled out and primary attack by *D. teres*, *B. sorokiniana* or *Drechslera tritici-repentis* counted. Discoloured coleoptiles or stem bases on all plants were cut off and rinsed in a sieve under running tap water. They were placed on filter paper and treated and assessed as in the osmo-analysis above.

Statistical analysis of differences between samples was performed by t-test (SAS Institute Inc., Cary, NC 27513, USA).

Results

Spring barley

Figure 1 presents the infestation by *D. teres* in barley at different sampling dates according to the osmo-analysis. Each line represents one field and the last point is the combine harvest sample. The time scale is given in Julian days where day 205 is 24th of July and 255 12th of September. Figure 2 represents the corresponding infestation by *B. sorokiniana*. Figure 3 shows the frequency of diseased plants that emerged when seed samples were sown in soil. The values are the sum of plants with primary leaf symptoms and plants with discoloured coleoptile/stem base. The change in seed health between a sample taken approximately 20 days before harvest and the combine harvested grain is shown in Table 1 for all fields.

Spring wheat

The kernel infestation by *D. tritici-repentis* in spring wheat from 1998 is presented in Figure 4. The infestation was weak in 1997

and in 1999 no samples were analysed.

Water content

Figure 5 illustrates the water content of the kernels in samples taken at different times before combine harvest.

Discussion

The weather in 1997 was dry until early May and thereafter followed by a cool and rainy period. This caused a prolonged period for sowing with almost one month between first and last seeding dates. In four cases, the same seed was sown at a long interval on different fields. In these cases there was a

higher frequency of primary leaf symptoms of *D. teres* at early sowing, which supports earlier findings (Olofsson, 1976) that sowing under conditions that cause a slow germination/emergence favour primary attack by *D. teres*. During the other two years, seeding occurred more simultaneous and no such effect could be observed.

In 1997 most seed lots were weakly infested by *D. teres* (4 -11%) but three were infested from 37 to 92%. The frequency of plants with primary leaf symptoms was strongly correlated with seed infestation. In 1998 all seed lots were infested less than 10%, while

in 1999 all but one had an infestation exceeding 20%. The severely infested seed lots were treated with Cedomon. For these two years no correlation between seed infestation and primary symptoms could be detected, which probably is due to the seed treatment and that the weather was unfavourable for primary attacks in 1999.

All farms investigated were animal farms where cereals were a small portion of the crop rotation. Only in one case was barley the preceding crop to barley. The kernel infestation in this field was stronger than in two other fields sown under similar condi-

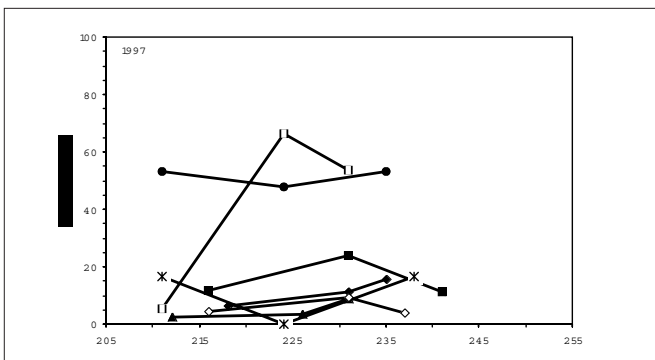


Figure 1a.

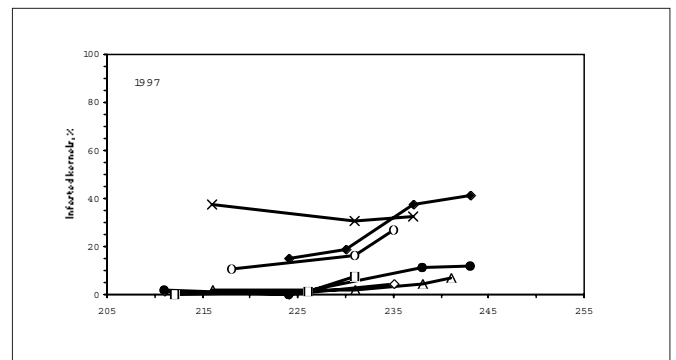


Figure 2a.

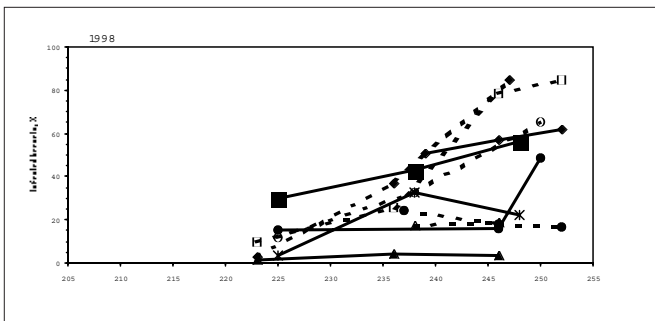


Figure 1b.

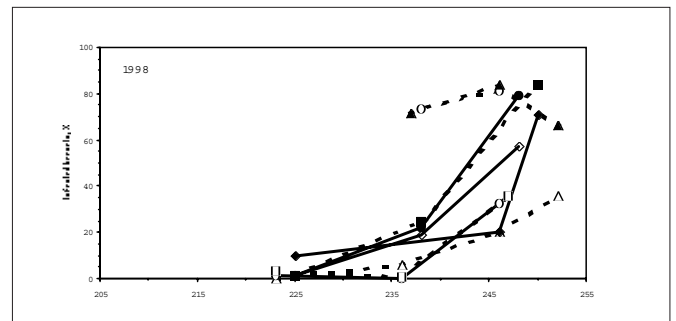


Figure 2b.

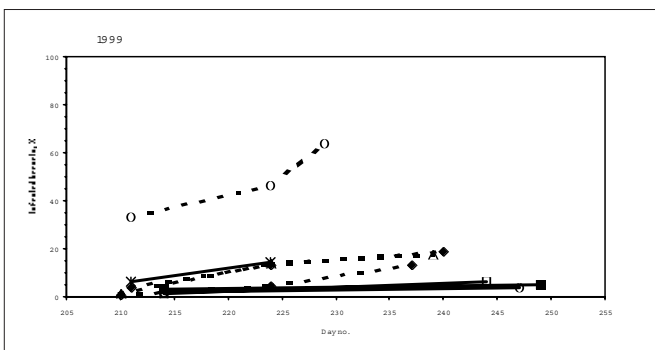


Figure 1c.

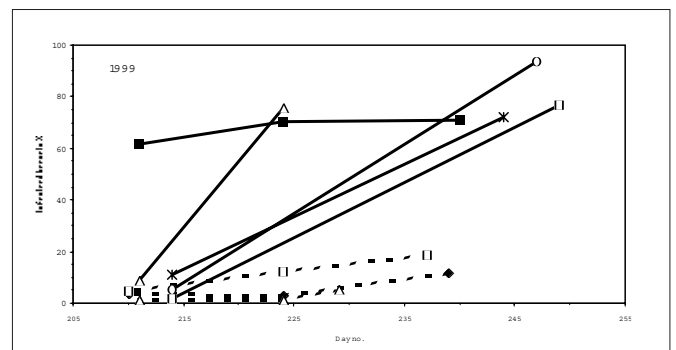


Figure 2c.

Figure 1. Kernel infestation by *D. teres* in spring barley fields at different sampling dates according to osmo-analysis. Solid lines show fields sown with untreated seed and broken lines represent fields sown with Cedomon-treated seed.

Figure 2. Kernel infestation by *B. sorokiniana* in spring barley fields at different sampling dates according to conidie formation on the kernels in the osmo-analysis. Solid lines show fields sown with untreated seed and broken lines represent fields sown with Cedomon-treated seed.

tions where lay and peas were the preceding crops.

The seed infestation increased considerably during the ripening of the crop. This was most remarkable for *B. sorokiniana*, but was also significant for *D. teres* and *D. tritici-repentis*. Particularly in 1998, which was very rainy with 14 days of rain during the three-week period before harvest. The kernel infection increased during this period with almost 30 and 40 percent units respec-

tively for *D. teres* and *B. sorokiniana* (Table 1). Also in 1999, which was extremely warm and dry, there was a remarkable increase in kernel infection by *B. sorokiniana*.

In inoculation experiments Kurppa (1985) found that the highest seed infection occurred two to three weeks after heading. At the assessment of leaf necroses (not shown) there was normally a very low frequency of spots caused by *B. sorokiniana* as long as the leaves were green, but they increased rapid-

ly when the canopy started to turn yellow. This is also in agreement with own findings in spore-trap experiments that few spores were trapped until early August when a sharp increase occurred (unpublished).

As can be seen in Figure 3 and Table 1, there was a large increase in the number of plants that became diseased when sown in soil, which shows that even late infections are harmful to the seed. Kurppa (1985) found in his investigation with *B. sorokiniana* that the

Table 1. Change in seed infestation between samples taken before harvest and at combine harvest and the frequency of diseased plants when sown in soil. The seed heath at harvest and number of days between samples are also given.

Year/ Field no.	Change in infestation, osmo-analysis, %-units		Infestation at harvest, osmo-analysis, %		Change in diseased plants, sown in soil, %-units	Days between samples
	<i>D. teres</i>	<i>B. sorok.</i>	<i>D. teres</i>	<i>B. sorok.</i>		
1997						
Field 1	+ 9,0*	+ 16,5*	16	27	+ 10,5*	17
Field 2	- 0,5	+ 5,0*	11	7	+ 18,5*	25
Field 3	+ 4,0	- 5,0	10	33	+ 10,0*	15
Field 4	+ 6,5*	+ 7,5*	9	8	+ 34,5*	19
Field 5	+ 48,0*	No infestation	54	0	+ 12,5*	20
Field 6	± 0	+ 3,5*	53	5	+ 25,5*	20
Field 7	± 0	+ 12,0*	17	12	+ 30,5*	24
Field 8	No infestation	+ 26,5*	0	42	+ 50,5*	19
Average 1997	+ 9,7 %-units	+ 10,9 % units			+ 24,1 %-units	
1998						
Field1	+ 59,5*	+ 30,0*	85	36	+ 44,5*	16
Field 2	+ 3,0	+ 31,0*	5	33	+ 51,5*	13
Field 3	+ 82,0*	+ 32,5*	85	36	+ 36,5*	24
Field 4	+26*	+ 56,0*	56	57	+ 25,0*	23
Field 5	+ 18,5*	+ 78,5*	22	80	+ 46,0*	23
Field 6	+ 33,5*	+ 61,5*	49	71	+ 26,5*	25
Field 7	+ 53,5*	+ 82,5*	65	84	- 0,5	25
Field 8	+ 1,5	+ 7,5	19	81	- 7,5	8
Field 9	- 7,5	- 5,0	17	67	+ 7,0	15
Field 10	+ 11,5*	+ 0,5	62	3	0	13
Average 1998	+ 28,2 %-units	+ 37,5 % units			+ 23,4 %-units	
1999						
Field 1	+ 3,5	+ 8,5*	18	12	Not done	15
Field 2	+ 8,5*	+6,0	13	19		15
Field 3	+ 8,5*	+ 68,0*	15	76		13
Field 4	+ 30,5*	+ 4,0*	64	5		18
Field 5	+ 4,5	+ 61,0*	6	72		30
Field 6	+ 1,5	+ 88,5*	4	94		33
Field 7	+ 2,0	+ 75,0*	5	77		35
Field 8	+ 6,0*	+ 0,5	19	71		16
Average 1999	+ 8,1 %-units	+ 38,9 %-units				

* Significant difference between samples, t-test P < 0.05

highest embryo infection occurred at a late inoculation shortly before ripening stage.

The water content of the kernels decreased almost linearly during ripening (Figure 5). Technically it ought to be possible to harvest at water content of 35%. Except for the rainy 1998 the kernels in samples collected 15 days before combining had moisture content below this value. Many of the seed samples harvested during the three-week period before normal harvest should, according to Swedish regulations for seed infestation, be able to be certified as organic seed without seed treatment, which samples of the normal harvest would not, due to a low level of seed infestation. At this moisture content the cost

for drying would amount to 17 SEK (1.8 ECU) per 100 kg if sold undried to the farmers cooperation, but it is estimated to eight SEK if dried at the farm.

The germination rate in samples taken up to 30 days before harvest did not show any decrease when sown in soil (not shown) compared to the samples from normal harvest. On the contrary, the germination rate was often higher particularly if the harvest sample was severely infested by *B. sorokiniana*.

Acknowledgement

This investigation was sponsored by the Swedish Board of Agriculture (SJV 29-

5910/96). Thanks are also given to Jamal Husain who did the osmo-and soil analysis on the samples in 1997 and to Dr. Christer Svensson for valuable discussions.

References

Joelsson, G., 1983. A method for rapid determination of seed-borne fungi. Proceedings 20th ISTA Congress, Ottawa June 17-25, 4 pp.

Kurppa, A., 1985. The response of some barley cultivars grown in Finland to air-borne secondary infection by *Bipolaris sorokiniana*. Journal of Agricultural Science in Finland, 57, 97-105.

Olofsson, B., 1976. Undersökningar rörande *Drechslea*-arter hos korn och havre. [Investigations on *Drechslea* species in barley and oats]. Statens Växtskyddsanstalt, Meddelande 16:172, 323-425.

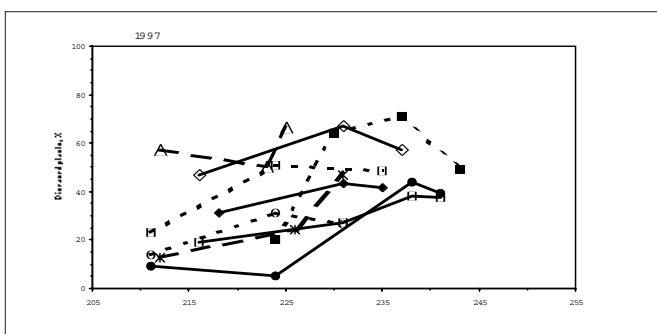


Figure 3a.

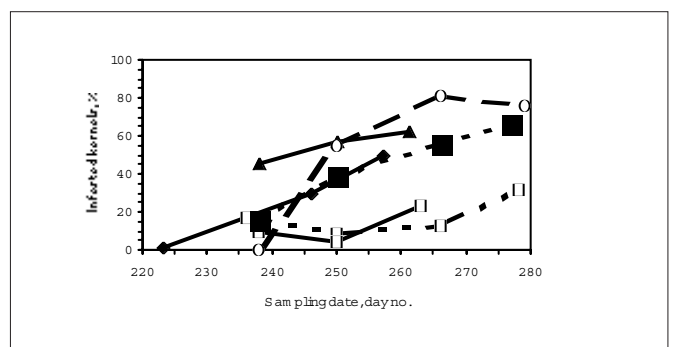


Figure 4. Infestation by *D. tritici-repentis* in samples of spring wheat collected at different dates before combine harvest in 1998. Each line represents one field.

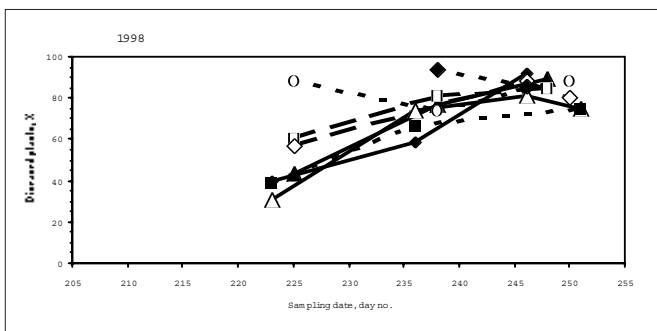


Figure 3b.

Figure 3. Frequency of diseased plants (primary leaf symptom and discoloured coleoptile/stem base) when seed samples collected in spring barley fields at different sampling dates were sown in soil. Each line represents one field.

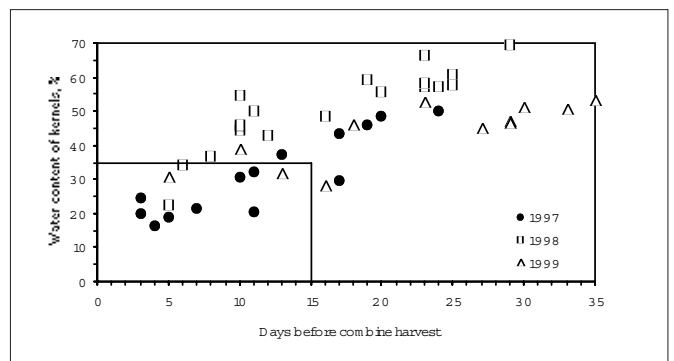


Figure 5. Water content of kernels at different number of days before combine harvest.

visit **ISTA OnLine** at www.seedtest.org

Proficiency Test Programme for Flower Seed Testing - Initial Questionnaire

By Zita Ripka, ISTA Flower Seed Committee Chair

At the Extraordinary Meeting in Zurich last year it arose that the ISTA Proficiency Test Programme gives no opportunity to check test performance for laboratories that declared flower species among their scope of accreditation. (The situation is the same for tree and shrub seeds.) To see whether we could start a proficiency test programme for flower seeds in the future triennial period, the ISTA Secretariat circulated a questionnaire among the ISTA Member Laboratories to collect data on the subject and the Flower Seed Committee evaluated the received data.

36% of the ISTA Member Laboratories are interested in proficiency tests for flower seed and 20% of the laboratories have flower species among their scope of accreditation (Figure 1).

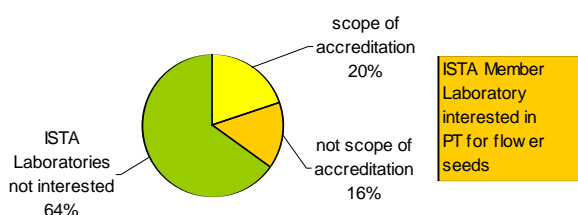


Figure 1. Percentage of ISTA Member Laboratories with and without flower species in their scope of accreditation which are interested in a proficiency test programme for flower seeds.

47 laboratories sent back data including the kind of tests they carry out for flower seeds, i.e. germination, purity, moisture and Tetrazolium test, and named 40 flower species as the most frequently tested. About one third of the laboratories performing both germination and purity tests (Table 1).

Table 1. The table shows the kind of tests, germination (G), purity (P), moisture (M), and Tetrazolium (T) carried out by the interested laboratories

Kind of Test(s)	G	GP	GPM	GPT	GTM	GPMT
# performing these tests	8	16	9	1	1	11
% performing these tests	17%	34%	19%	2%	2%	23%

Table 2 shows the order of the 40 flower species. The Flower Seed Committee decided that the first 5 species, i.e. *Viola*, *Tagetes*, *Zinnia*, *Dianthus* and, *Petunia*, shall be chosen for the purpose of the proficiency tests.

Work progressed so far for the time being. The next steps will be:
 -to find out if we can provide the required amount of seeds for 3 parallel tests;
 -to find an ISTA laboratory to prepare the samples for the purpose;
 -to find out the means of evaluating the test results.

Since this project is important for the interested laboratories we would like to be able to find a way to start a proficiency programme for flower seed testing as soon as possible. ■

Table 2. The flower species are listed according to their frequency being tested by the all laboratories (total). Further, it shows the number and percentage of laboratories, with and without flower seeds in their scope of accreditation, which named this species.

Species	Total (47)	%	Accredited (22)	%	Non-Accr. (25)	%
Viola	25	53	15	68	10	40
Tagetes	23	51	18	90	5	20
Zinnia	20	44	15	75	5	20
Dianthus	19	42	11	55	8	32
Petunia	19	42	13	65	6	24
Callistephus	15	33	10	50	5	20
Impatiens	13	29	7	35	6	24
Calendula	12	27	4	20	8	32
Tropaeolum	11	24	4	20	7	28
Antirrhinum	10	22	6	30	4	16
Chrysanthemum	9	20	4	20	5	20
Lathyrus	8	18	4	20	4	16
Dahlia	7	16	3	15	4	16
Helianthus	7	16	4	20	3	12
Pelargonium	7	16	5	25	2	8
Aster	6	13	3	15	3	12
Begonia	6	13	1	5	5	20
Centaurea	6	13	2	10	4	16
Cosmos	5	11	1	5	4	16
Matthiola	5	11	4	20	1	4
Portulaca	5	11	2	15	3	12
Primula	5	11	3	15	2	8
Salvia	5	11	3	15	2	8
Cyclamen	4	9	2	10	2	8
Gypsophila	4	9	2	10	2	8
Iberis	4	9	1	5	3	12
Limonium	4	9	2	10	2	8
Lobelia	4	9	2	10	2	8
Ageratum	3	7	2	10	1	4
Eschscholzia	3	7	0	0	3	12
Helichrysum	3	7	3	15	0	0
Papaver	3	7	2	10	1	4
Verbena	3	7	2	10	1	4
Gazania	2	4	1	5	1	4
Mirabilis	2	4	2	10	0	0
Nicotiana	2	4	1	5	1	4
Bellis	1	2	1	5	1	4
Helipterum	1	2	0	0	1	4
Myosotis	1	2	0	0	1	4
Xeranthemum	1	2	0	0	1	4

1st ISTA Open Forum Discussion on (Semi-) Quantitative GMO Testing

Bassersdorf, Switzerland
December 8 - 9, 2003

By **Bettina Kahlert**, ISTA GMO Proficiency Test Working Group Leader

The varied results of the (semi-)quantitative GMO testing of the 2nd Proficiency Test had showed clear evidence that information exchange was needed. Participants of the ISTA Proficiency Test on GMO Testing were invited to a round table discussing on (semi-)quantitative GMO testing. All of them might have gained different experiences with the sample preparation and testing processes such as test plans, grinding, testing kits and standards, and had thought about solutions to enhance their procedures for improving results in the future. This informal meeting was an opportunity to present, exchange and discuss these experiences about (semi-)quantitative GM testing. Following the vision to archive true results in future proficiency tests, the meeting objectives were defined:

1. Exchange experiences, problems and solutions to enhance our procedures in semi-quantitative and quantitative testing in the future.
2. Collection of solutions and conclusions for future proficiency tests which can be distributed to all participants of the GMO proficiency test programme.

Despite the busy time of year, twelve participants attended the meeting at the ISTA Secretariat, Switzerland, December 8 - 9, 2004. In the first session the participants gave short presentations about their results, experiences and questions that arose during the testing. For example, they presented what had caused in their case the variation from the true values of the GMO content or what had they done or they might do to improve results in the future. These presentations were essential to this round table and served as a discussion basis.

The second session of the first day was chaired by Sylvain Grégoire, ISTA Statistics Committee Chair, and Kirk Remund, ISTA Statistics Committee Member, and they presented information to the topic 'How do we design a test plan?' Errors in test results are not only due to the fact the laboratories have problems with the technical procedures in the laboratory to detect and quantify GM seeds in non-GMO seed samples but also related to inappropriate test plans. The aim of the session was to show that with a little knowledge laboratories can answer questions such as: I already made the test, how can I answer to ISTA if the GM seed content is above or below 1%? I want to define a test plan with the seeds I received, what is appropriate to the question ISTA asked?

The session was started with a short introduction on the different types of questions usually behind the tests. Two types of tests were discussed: (1) Quantitative tests and (2) tests with presence/absence per pool, when the seeds are divided in a set of pools (semi-quantitative test). They used questions received from the laboratories for each type of test and gave short answers. Then they used actual results from the second proficiency test to illustrate general notions.

On the second day, the participants discussed 'How can we improve our skills in the laboratories regarding quantitative results testing?' A discussion on technical aspects of quantitative testing based on the presentations from the previous day led to a collection of solutions and conclusions for future proficiency tests which can be read in 'Notes: 1st ISTA Open Forum Discussion on (Semi-)Quantitative GMO Testing' which reflects the view of the meeting participants. Please visit the ISTA Website or contact the ISTA Secretariat. ■

Information on the ISTA Proficiency Test on GMO Testing

The 3rd ISTA Proficiency Test Round on GM seed testing on maize (*Zea mays* L.) was started in January 2004. Each of the fifty participating laboratories received twelve test samples. The samples contained approximately 1500 seeds. Some of the samples were positive (i.e. contained GM seeds) and others were negative (i.e. did not contain GM seeds). The aim of this test was to check the ability of individual laboratories to detect and, on an optional basis, to quantify the presence of GM seeds in samples of non-GMO seed of *Zea mays*. We had already offered the opportunity to the participants performing both the qualitative test as well as a quantitative test in the second proficiency test round. About one quarter performed a semi-quantitative test and more than one third of the participants submitted quantitative for the GMO content of the test samples (see page 15-17, STI 126).

We were successful in encouraging the participants to submit also in this round quantitative test results. More than half of all participants submitted quantitative results. These results will help to strengthen any inferences made on quantitative tests. At the congress 2004, the overall results of the 3rd round will be presented to the ISTA Membership.

The 4th round should start shortly, detailed information will be provided on the ISTA Website in May (www.seedtest.org). All previous participants will be informed by email.

For more information please contact the ISTA Secretariat, bettina.kahlert@ista.ch

An Introduction to the ISTA Technical Committees

The principle objective of ISTA is to develop and standardise methods for sampling and testing of seeds quality parameters such as germination, purity, moisture, or seed health, using the best scientific knowledge available.

An important aim is to promote research in all areas of seed science and technology through publications, training programs and meetings. The Technical Committees are responsible for the organisation of Symposia, Seminars and Workshops.

These tasks are subject-focused in 15 Technical Committees and a Task Force where scientists of different research fields and specialists from all over the world work closely together for the improvement of seed testing. The Technical Committees perform comparative studies, surveys and exchange information about specific issues. A committee may have several working groups composed of seed specialists on particular subjects. These committees are responsible for the development and improvement of the 'International Rules of Seed Testing' and ISTA Handbooks on seed methods including sampling, testing, processing and distributing seeds.

If you are interested in Technical Committee membership, or would like to find out more, please contact Bettina Kahlert, at bettina.kahlert@ista.ch, who is head of Technical Committee Administration. Membership of the Technical Committees is usually decided during the triennial ISTA Congress. Between Congresses new members are only accepted to replace Technical Committee members who have cancelled their membership.

Who can become a Technical Committee Member?

The ISTA Technical Committees welcome scientists of different research fields of seed science and specialists in seed testing from seed testing laboratory, universities, research institutes and companies from all over the world.

How to become ISTA Technical Committee Member

1. Choose a Technical Committee

The first step is to choose the appropriate Technical Committee, i.e. the field of seed testing which fits to your expertise. Information regarding the specific ISTA Technical Committees is available on the website at www.seedtest.org or directly from the ISTA Secretariat.

2. Contact Chairperson

After you have chosen a Technical Committee the second step is to contact the Chairperson of this committee to indicate your interest. Please obtain the contact details of the Chairperson from the ISTA website or send your informal application to the Technical Committee via the ISTA Secretariat.

Each Chairperson decides for his/her committee whether an applicant fulfils the requirements to become a committee member. Please explain briefly in your application what are your qualifications, your position and the technical duties you perform at your seed testing laboratory, institute or company. Your application should also include your contact details such as name, mailing address, phone and fax number, and e-mail address.

3. Membership approval by the ISTA Executive Committee

If the Chairperson decides you meet the requirements for membership, he will send an application via the ISTA Secretariat to the ISTA Executive Committee for your membership approval. The application will include relevant information for the Executive Committee regarding your expertise.

4. Contact details are sent to the ISTA Secretariat

After you are approved as a new ISTA Technical Committee Member by the ISTA Executive Committee, your contact details will be recorded in the ISTA Secretariat database and you will receive a Certificate indicating your Technical Committee membership for the current triennial.

ISTA Bulking and Sampling Committee

The Bulking and Sampling Committee is primarily responsible for the updating of Chapter 2 of the ISTA Rules. Upcoming new sampling technology, increasing scientific knowledge about uniformity of seed lots and ongoing changes in quality assurance systems in seed companies and in seed certification systems are requesting an ongoing adaptation and improvement of seed sampling rules.

Sampling is the connecting point between the seed testing laboratory, the seed company and the seed certification agency and has to consider scientific and commercial aspects as well as regulatory requirements. Therefore, the Committee has a broad personal basis in all these areas and is a plenum for a fruitful exchange of experience and for decision making for the benefit of representative seed sampling and reliable test results. ■

ISTA Flower Seed Testing Committee

The aims and goals of the Flower Seed Testing Committee are:

- 1. To clarify laboratory seed testing methods listed in the ISTA Rules in Table 5A Part 3 by issuing an ISTA Handbook on Flower Seed Testing.**
- 2. To provide and introduce laboratory seed testing methods for new species which are tested in the laboratories but not included in the ISTA Rules yet.**
- 3. To give practical information about flower seed testing for interested analysts by organizing workshops or just by being available in the everyday work.**

As a result of the past years work sheets of the new handbook about testing *Calendula*, *Viola*, *Dianthus*, *Gaillardia* and *Impatiens* genera are almost finished (some photos are still missing). Two more work sheets - *Cyclamen* and *Petunia*- are prepared and are presently circulated for approval within other ISTA committees. The next 7 drafts for the handbook are under preparation: *Ageratum*, *Callistephus*, *Coreopsis*, *Zinnia*, *Dahlia*, *Gazania* and *Cosmos*. This spring ring tests will be organized for *Geranium*

and *Begonia* germination test.

As a result of the data collecting work within the committee we have got that there are two species - *Catharanthus roseus* and *Eustoma grandiflorum* - that were tested quite a lot in some laboratories but there is no official ISTA method for them.

Also there are some species that have AOSA test method but not included in the ISTA Rules. Indication arrived from a United States commercial laboratory that AOSA guidelines includes the following 9 species and ISTA Rules does not:

Alcea rosea, *Chrysanthemum parthenium*, *Crossandra infundibuliformis*, *Eustoma grandiflorum* (*Lysianthus*), *Fuchsia x hybrida*, *Hypoestes phyllostachya*, *Plumbago auriculata*, *Veronica x hybrida*, *Zinnia angustifolia*

And the following species are not listed in either ISTA or AOSA:

Agastache urticifolia, *Alstromeria x hybrida*, *Impatiens hawkerii*, *Pentas lanceolata*, *Trachelium coeruleum*

We get only to detect these problems but to make steps forward new ISTA methods will be postponed to the next period of our work.

To achieve our above aims we organize temporary working groups for the actual tasks. The activity of a working group leader is the following:

1. To create a questionnaire to collect data on the test conditions of the species. These questionnaires can be sent out to every member of the FSC Committee. By the results they can see which are the tricky points of the testing procedure.
2. If there are any difficulties they can organise a referee test to decide on the right method.
3. Preparation of draft working sheet or new method by the above results.

The working group members are to help the work of the leader by filling the questionnaires and send back in time. The same goes for the referee tests. Interested analysts are welcomed in our working groups.

We organized the first Flower Seed Testing Workshop 12-16 May, 2003, Budapest-Hungary. The written material about the proceedings of the workshop for those interested analysts who were not able to participate is available at the ISTA Secretariat. ■

ISTA Forest Tree & Shrub Seed Committee

Members of the FTS Committee deal with tree seed testing itself, but also with many other, related research activities, such as storage, presowing treatment (stratification) and seed-borne diseases.

Currently, the FTS members come mostly from European countries, from USA, Canada and Malaysia. However, we are seeking to involve seed technologists and scientists from Africa, South America, Australia and New Zealand. In the southern hemisphere, and especially in the tropics, there are many tree species for which methods are needed for the evaluation of seed quality, for seed storage, for breaking dormancy and for maximising germination. The committee has only just started (2001-2004) to address such issues.

Activities of the FTS Committee are focused first of all on the development of test methods that can be introduced into the ISTA Rules and be applied to species used in international trade.

Some of the most important tasks are:

- Generation of information that will contribute to a revision of current methods, and to the introduction of new methods and species into the ISTA Rules
- Elaboration of procedures for proficiency testing of forest tree and shrub seeds
- Organisation of workshops and meetings dealing exclusively with methods for quality evaluation of tree seeds ■

ISTA Germination Committee

Germination is a basic and one of the oldest criteria for seed quality evaluation. Within ISTA, many studies have been carried out in 80 years or so. Nowadays, the ISTA rules for germination offer thousands of equivalent alternative methods for more than 600 species covering the Agricultural and Vegetable species, Tree and Shrubs, Flower, Spice, Herb and Medicinal species. The germination test methods are more or less the same since the beginning of the 20th century: to germinate seed samples in a substrate, in

controlled environmental conditions. The aims of the Germination Committee are mainly:

- 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. A specific attention will be brought to tropical and subtropical species.
- To share the knowledge among laboratories and seed testing people to facilitate the exchange and improve the standardisation.

The committee has recently produced a new handbook for seedling evaluation (editors: R. Don, G. MacLarren, B. Kahlert), and is revising the structure of the substrate part of the germination chapter. This includes the extension of the authorised substrates to mixtures of mineral and organic compounds.

The work is done within working groups gathering experts and voluntary people from all origins interested in sharing experience. Close links exist with other committees (flower, tree and shrub, statistics) or the ISTA Accreditation Department.

The committee is very interested in listening and sharing suggestions from all. ■

ISTA Moisture Committee

The moisture test is used during all steps in the process of seed production. It is used for predicting harvest time in the field, for monitoring the drying of the seeds, during processing to prevent mechanical damage, during storage for longevity. It is used in research and for routine purposes. In addition it is used for certification purposes.

The work of the committee involves several fields. Improving and extending the moisture chapter in the ISTA Rules. Aspects that we look at are extending the number of species that is covered, and improving the methodology for orthodox and non-orthodox seeds. In the past years some exciting new techniques for moisture testing have been developed. We will have to investigate how they may fit in the ISTA Rules.

The committee organised its first moisture workshop in 2003. In addition we started gathering information for a handbook on moisture testing.

Membership of the committee or working groups is open to all who are interested. Especially welcome are people from other organisations as ISTA that are involved in moisture testing, and people from other Technical Committees of ISTA. These could act as liaison between the Moisture Committee and the organisation or committee they represent. Committee members participate on a voluntary basis. ■

ISTA Nomenclature Committee

The Nomenclature Committee provides a forum to resolve matters relating to the scientific and common names of plants important both as intended and unintended components of commercial seed. Decisions regarding the proper spelling, application, authorship, and taxonomic classification of names for crops and weeds are reflected in products like the ISTA List of Stabilized Plant Names and the Multilingual Glossary of Common Plant Names, both of which are the result of Committee activity. A new edition of the Stabilized List was completed in 2001 and is now available on the web <http://www.ars-grin.gov/~sbmljw/istain-trod.html>. A multilingual glossary of common names for crop plants will be the next major focus of the committee. ■

ISTA Purity Committee

The currently-active working groups within the Purity Committee include the following:

Pure Seed Definitions

The Purity Committee is also involved in a cooperative effort by ISTA and AOSA to move toward increased harmonization between the two sets of Rules. This process is beginning with comparisons of the pure seed definitions.

Proficiency Testing Committee Liaison and Identification of Seeds

These two working groups have prepared a list of crop and weed species that could be

used as a 'universal list' that all ISTA laboratories would be expected to have in their reference collections. This list could also be used by the Proficiency Testing Committee for crops and inclusions in the preparation of referees. This list will be discussed at the Budapest Congress.

Blowing

This working group has been involved in preparation of a new rule proposal to blow *Poa pratensis* varieties with low seed weights at a lower blowing point. This would give a higher pure seed percentage for small-seeded varieties. This rule proposal will be voted on in 2004, in Budapest.

Mixtures

The Purity Committee has spear-headed the preparations to add the analysis of seed mixtures to the ISTA Rules. This involves cooperation with a number of other committees, including Statistics, Bulking and Sampling, and Germination. New procedures for the ISTA Rules were drafted, but the decision was made to postpone submitting these for a vote until after the Budapest Congress. This topic will be discussed there.

Workshops

A two-day workshop was held in conjunction with the AOSA/SCST Annual Meeting in Seattle, WA, USA. This workshop covered topics including ISTA Rules changes, identification of *Centaurea* spp., calibration and monitoring of equipment, differences among PSD's in ISTA and AOSA Rules, *Bromus* spp. identification, and identification of *Poa* spp. There were about 38 attendees from Europe, Asia and North America. Another two-day workshop is in the early planning stages for the Budapest meeting. ■

ISTA Seed Health Committee

The Seed Health Committee develops and publishes validated procedures for seed health testing, and to promote uniform application of these procedures for evaluation of seeds moving in international trade. Members of the SHC participate in conferences and training courses aimed at furthering these objectives, and establish and maintain liaison with other organisations having common or related interests in seed.

The SHC currently consists of 15 members

from 12 countries. Each member has an assigned role within the committee. There are two subcommittees that deal with method validation and quality assurance and proficiency testing as well as four working groups organized along topic areas as determined by the SHC. The Methods Validation sub-committee oversees and manages the SHC Methods Validation Programme. The Proficiency Testing and Quality Assurance sub-committee develops, manages and directs the proficiency testing and quality assurance programmes of the SHC. This group interacts closely with the ISTA Proficiency Testing Committee and ISTA accreditation auditors.

Each working group is responsible for a broad area of study (mycology, bacteriology, virology and nematology). The working group leaders coordinate and guide the activities of a number of sub-working groups or study areas working on specific methods within the topic area. The main objective of the working groups is to identify and obtain new validated methods for ISTA.

Any analyst in a laboratory experienced in the type of testing required in the proposed method may collaborate in the activities of a working group. Analysts may be recruited by personal contact, or through advertisement in the ISTA Seed Testing International or on the ISTA Website. Interested analysts may contact the SHC and be placed in an inventory of potential collaborators for current or future studies. ■

ISTA Statistics Committee

If you are involved in statistics in relation to plants you might be interested to join the Statistics Committee. Of course the scope of activity is related to seed testing. This covers wide areas as all technical activities may benefit from statistics (physiology, pathology, vision recognition, inter-laboratory tests, etc...). Teachers in universities or Agricultural high schools, persons involved in the seed industry, researchers in plant breeding, and many others might be interested in our projects.

The work is made on a voluntary basis. Within the committee some projects are under the responsibility of sub-groups; while for other demands members interact individually with colleagues of other committees.

The aim of the statistics committee is to provide help to all other ISTA committees. Nevertheless the exchange between individuals is fruitful "not only for ISTA work", as the questions are usually also of interest in your own job when you collaborate on a given subject. ■

ISTA Seed Storage Committee

There are 14 scientists from 7 different countries registered and involved with the Seed Storage Committee. The common goal of the committee is the development and/or improvement of effective medium- and long-term storage methods. To achieve these goals it is important to have an appreciation of the biological processes that underlie the seed storage behaviour and how these processes are affected by actual storage. This is particularly true of recalcitrant (non-orthodox) seed germlasm.

At present the committee is divided into three working groups *viz.* Orthodox seeds; Non-Orthodox Seeds and Development of Methodologies. Research aspects in common to all three working groups are the impact of the seed associated mycoflora and the rôle of cryopreservation. ■

ISTA Tetrzolium Committee

The aim of this introduction is to invite you to join the ISTA Tetrzolium Test Committee as a member of our Working Groups.

As a member of an Accredited ISTA Member Laboratory, you could have the possibility of working as a member of a Working Group participating in proficiency tests regarding tetrzolium tests, which will allow you to acquire experience in this matter, demonstrate your competence on new species and get in contact with other colleagues who are also interested in sharing their knowledge. This would allow a joint improvement with open possibilities of:

- Proposing and working on a new species (still not included in Table 6A of the ISTA Rules) in order to study it.
- Proposing the method so that a new species (still not included in Table 6A of the

ISTA Rules) could be studied.

- Proposing that a new species already included in Table 6A of the ISTA Rules could be studied again in case you consider the current methodology proposed is not the most adequate.
- Obtaining an ISTA Diploma (as an acknowledgement to the commitment assumed by every member of a working group).

If you are interested in working with us, please contact amartinelli@waycom.com.ar as soon as possible.

Looking forward to having your valuable support in our ISTA Tetrzolium Committee. ■

ISTA Vigour Committee

The Vigour Committee has for many years conducted international collaborative research into the development of vigour tests. The year 2001 was a landmark year for the committee when the ISTA Membership voted to accept their proposal to include Seed Vigour as a chapter in the ISTA Rules. Two vigour tests, the Accelerated Ageing Test for soybean and the Conductivity Test for garden pea, were, at that time, accepted as ISTA validated tests. This has led us to a new additional aim to our work, namely to promote the accurate implementation of these tests. This we are currently doing through ISTA Workshops, with two completed (USA, Austria) and two planned (China, Thailand). In addition, eighteen ISTA laboratories have participated in a proficiency test in which their results from completed conductivity tests have been compared. We are also actively promoting education in vigour testing through the production of three videos, 'What is Seed Vigour', which is available through ISTA Publications, and two videos that are in production, which are based on the two validated tests.

The traditional aim of the committee to research and develop vigour tests is still followed through our working groups. We have two main approaches to this aim. The first is to examine the potential for extending the species base of the two validated tests, with working groups considering the application of Accelerated Ageing to maize and wheat and the Conductivity Test to soybean. The second is to continue to examine the application of the process of ageing in vigour tests through further comparative tests on the Controlled Deterioration Test, which we

have already completed for several years. Finally, one working group is focusing on the application of the tetrzolium tests as a vigour test for maize. This test may have particular application in developing countries, where equipment and / or specific environmental conditions for testing may be difficult to achieve. Thus, the work of the Vigour Committee is both focusing on past achievements and looking towards the future. ■

ISTA Variety Committee

ISTA's objective for variety verification of species and cultivars is to determine the extent to which a seed sample conforms to the species or cultivar claimed for it. The Variety Committee is responsible for Chapter 8 of the International Rules for Seed Testing dealing with the methods of variety verification. New technologies, such as biomolecular methods for the detection of genetically modified seeds within conventional seed lots makes it necessary to update the chapter at the moment. This review is done in cooperation with the GMO Task Force.

An aim of the committee is to carry out an inventory on methods for verification of varieties and cultivars of 'all' existing ISTA and non-ISTA methods. It should provide information about current methods but also identify where methods are needed, e.g. for new species. ■

GMO Task Force

In the last years, the adventitious presence of genetically modified (GM) seeds in non GM seed lots has increasingly become a problem for the international seed trade. The GMO Task Force was established in 2001 to focus on activities to develop a system targeting the uniformity in GMO testing results, not only by the uniformity in GMO testing methodology, but by a performance based approach. For realisation of this approach, the ISTA GMO Task Force is active in the following directions:

- Establishing an ISTA Rules Chapter for detection, identification and quantification of GMO in conventional seed.
- Organisation of proficiency tests on GMO testing.
- Exchange of information between laboratories at workshops and offering training programmes. ■

3rd ISTA/FAO Workshop on Varietal Verification and GMO Detection

Nakhon Pathom, Thailand
November 25 - 29, 2003

By **Bettina Kahlert**, Head of ISTA Technical Committees Administration



The need for identification and detection of genetically modified (GM) seeds has increased with the rapid expansion in the cultivation of GM crops. The establishment of relevant, reliable and economical methodology for detection, identification and quantification of GMO content in conventional seed lots continues to be a challenge in international seed trade. A great number of different strategies and methods are available for GMO testing and the quality of these results depends more on the methodology and on the equipment used than in all other classical seed testing methods. However, it is not the equipment alone which leads to reliable and good results, but also the theoretical expertise and the practical skills of the technician handling the testing procedure. FAO has received several requests from its member countries for assistance in capacity building and as ISTA's seed testing laboratories act as competence centres and are able to supply the training required for varietal purity testing and GM seed testing, FAO and ISTA have established a cooperation with the aim to provide uniform test results all over the world.

Since 2002, ISTA and FAO offer training programmes to educate seed technicians in methods for the verification of species, cultivars and hybrids as well as for qualitative and quantitative GMO detection in the different regions of the world. ISTA was very pleased to offer the 3rd ISTA/FAO Workshop on this topic for laboratories located in the Asian-Pacific region. It was also the first time that a local organisation, the Asia-Pacific Association of Agriculture Research Institutes (APAARI) was involved. 23 participants from Bangladesh, Cambodia, India, Indonesia, Lao PDR, Malaysia, Nepal, P.R.

China, Philippines, Republic of Korea, Thailand and Vietnam came to the Department of Horticulture, Kasetsart University, Nakhon Pathom, in Thailand to learn and discuss electrophoretic and PCR-based methods in this training course.

ECOM member, Dr Chulhathep Pongsroypech, arranged the contact to Dr Thammasak Thongket. Thammasak Thongket and Dr Sermsiri Chanprem, both from the Kasetsart University, organised and prepared with big effort the laboratory facilities and equipment, accommodation for lecturers and participants, transport, catering and social events with such attention to detail that the lecturers and participants never missed anything. The workshop, both lecture section and laboratory practice was held in the new Centre for Agricultural Biotechnology building. The large modern and well equipped laboratory facilities provided best requirements for teaching a group of over 20 trainees. Sermsiri Chanprem composed a team of her students, who assisted with immense enthusiasm in the preparation.

We were very pleased that FAO agreed to increase the teaching team by one member, namely Dr Maximilliano Ballardini, to improve the supervision during the workshop.

The first part of the workshop 'Electrophoretic Methods for Varietal Verification' was handled by Prof Dr Norbert Leist and Mr Rainer Knoblauch. Norbert Leist took over the theoretical section, covering topics among others such as the field of application and general principles of the verification of species and cultivars, and the testing methods such as

Isoelectric Focusing in Ultrathin layer (IEF) of seed storage proteins and testing of seed storage proteins with PAGE, SDS and Isozymes. Rainer Knoblauch explained and advised with great sensitivity and humor the practical work including protein extraction, gel preparation, fixation, staining, destaining and evaluation of the gels on *Zea mays*, *Triticum aestivum*, *Cucumis sativa*, and *Oryza sativa*.

Dr Enrico Noli and Massimiliano Ballardini lectured on 'PCR based Methods for GMO Detection', including theoretical and practical work on molecular markers, DNA extraction, UV spectrometry, Agarose gel electrophoresis of extracted DNA, amplification of endogenous invertase gene, PCR for qualitative detection of CaMV 35S promoter in maize and soybean (screening method), *epsps* gene in RR soya and *cryIA(b)* gene in Bt maize and PCR for quantitative testing. It was the first workshop of this series that included Real time PCR in the practical section. This was made possible due to the great organisation and supervision of organisers and lecturers, the high interest and contribution of the trainees. We were very thankful to Sermsiri Chanprem that she was able to organise a Real time machine especially for this workshop.

We were very pleased that Dr Kakoli Ghosh, Agriculture Officer for capacity building from the Seed and Pant Genetic Resources Servers of the Agriculture Department, FAO, was able to attend the workshop. The success of the workshop was due to many factors, one of them being the support and interest shown by Kakoli Ghosh in each participant. ■

ISTA Variety Testing Workshop - Way to the future

The ISTA Secretariat, Bassersdorf, Switzerland
September 29 - October 1, 2003

By **Bettina Kahlert**, Head of ISTA Technical Committee Administration

The ISTA Variety Committee, chaired by Dr Harm Huttinga, organised a workshop from September 29th to October 1st, 2003, to discuss the future developments in variety testing and ISTA's role in it.

21 participants from 10 countries came to the northern part of Switzerland to present the work and projects which are conducted in their laboratories to gather the different experiences of the areas: field methods, morphological methods, biochemical methods, and DNA-based methods with the purpose to help in designing a working plan regarding the activities of the Variety Committee in the coming years.

Seed testing has been developed to minimise the risk of sowing seed that does not have the capacity to produce an abundant crop of the required cultivar by assessing the quality of seed before it is sown. The ISTA object of variety verification of species and cultivars is the determination of the extent to which a seed sample conforms to the species or cultivar claimed for it. Important requirements for variety testing methods within seed testing laboratories are that they are quick, simple to conduct, of low costs, clear in the evaluation, high in reproducibility, not poisonous and applicable to a high number of single seeds.

Often ISTA is asked: Why do you not use the UPOV methods to test seed for varietal verification? The main differences between the aims of ISTA and UPOV are that ISTA looks for seed lots whereas UPOV looks for varieties. UPOV defines a variety by the expression of all characteristics resulting from a given genotype and distinguish it from any other plant variety. Due to the complexity of their tests, these tests are not practicable for the daily testing in a seed testing laboratory. At the workshop 'the UPOV system of variety registration' was presented.

The aim of one of the working groups will

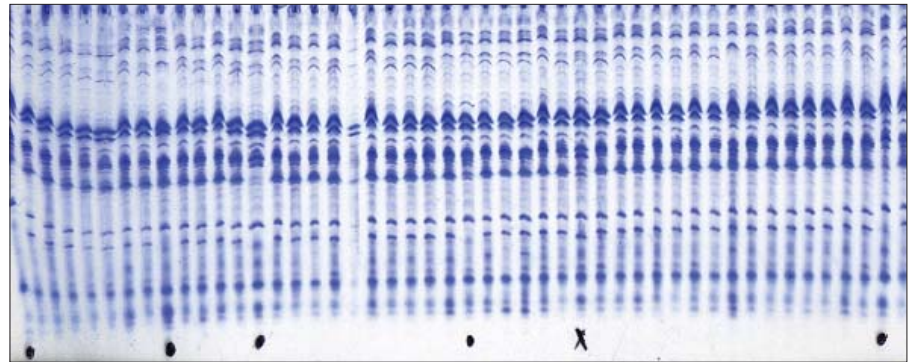


Figure 1. Hybrid - Quality of Maize
Method - CIEtOH, IEF pH 2-9

- selfpollination
- ✕ foreign pollination

be 'the method handbook for variety testing - a collection of 'all' existing ISTA and non-ISTA methods'. On national level many methods exist but they are not international rules. Therefore, a questionnaire will be sent to laboratories. The results of this questionnaire should lead to an inventory of which methods for which species are available where. It should provide information regarding current methods, identify 'white spots', (new) species where methods are needed and new methods. The biochemical methods, i.e. electrophoretic methods, or the different species could be described in the same way as the germination tables of the ISTA International Rules for Seed Testing. Such tables should address topics like species, extraction tools and media, composition of the gel, electrophoresis conditions, staining, evaluation, etc. For the assurance of uniformity in results received by laboratories, ISTA also offers proficiency tests for variety testing. In the future, a standardisation and acceptance of methods validated by ISTA should be achieved.

Next to the discussion around biochemical methods 'an overview of DNA genotyping technologies' such as SSR (microsatellite marker), SNP (single nucleotide polymor-

phism) and AFLP concept (Random multiplex SNP technology) was given. Also for these DNA-based methods a working group will establish an inventory of what is available in the public domain with respect to the primer sequences, to data already obtained and in correlation with biochemical data present. However, they are thought to be additional and should not replace the traditional system for all species. It is important to identify for which species molecular markers are needed.

Further topics presented at the meeting were 'biochemical and molecular marker for variety discrimination - a portfolio approach to variety identification', 'variety identification of *Vicia faba*' regarding disuniform characters, and 'GMO detection in conventional seed lots'.

Technical experts and scientists actually working in the area of variety testing are welcome to contribute to the work of the ISTA Variety Committee, either by participating in one of the working groups or by providing information about methods. For further information please contact the ISTA Secretariat (ista.office@ista.ch). ■

ISTA Forest Tree Seed Workshop

Prague, Czech Republic, October 20 - 22, 2003 & Post-Workshop Tour, October 23 - 25, 2003

By Peter Gosling, ISTA Forest Tree and Shrub Seed Committee Member

The third ever ISTA 'Forest Tree Seed Testing Workshop' was held in Prague, Czech Republic between October 20-22, 2003. Participants not only enjoyed formal instruction on Purity, Germination, Tetrzolium, Excised Embryo and Germination testing, but also made the most of the opportunity to engage in plenty of informal discussion and information exchange.

42 participants from 20 countries recently attended the third ever ISTA 'Forest Tree Seed Testing Workshop' in Prague, Czech Republic between October 20-22 2003. (Previous venues were Guildford, England, 1973 and Macon, Georgia, U.S.A, 1989).

This latest meeting was built on the successes of those earlier and was an ideal mix of practical exercises, demonstrations, presentations and discussion sessions. After the meeting there was an opportunity to choose between a 1-day trip to the State Tree Seed Centre in Tyniste nad Orlici or a 3-day tour which visited seed testing, processing and storage facilities in both the Czech Republic and Slovakia.

The list of participants is shown in Table 2 and the programme for the meeting in Table 1. Participants not only enjoyed formal instruction on Purity, Germination, Tetrzolium, Excised Embryo and Germination testing, but also made the most of the opportunity to engage in plenty of informal discussion and information exchange. Lively conversations could always be overheard at tea-breaks, meal times, on coach trips - and in the bar (when solutions to many anomalies became so much clearer!)

A number of practical tips on testing methods were swapped between participants and proposals were drawn-up and agreed on to introduce new test methods and species into the ISTA Rules at the next Congress.



Figure 1. 42 participants from 20 countries attended the third ever ISTA 'Forest Tree Seed Testing Workshop' in Prague, Czech Republic between October 20 - 22, 2003.

Specific examples of the latter include i) editorial changes to *Pinus densiflora*, *P. strobus* and *Eucalyptus* species; ii) clarification of the term 'double germination test'; and iii) the addition of *Pinus brutia* to the Rules. The third example provides the recently revised European Union Directive on Forest Reproductive Material with a suitable 'internationally accepted (seed testing) technique' for this species which would otherwise not exist.

It was calculated that there was the equivalent of 800 years worth of tree seed testing experience gathered in Prague. Every participant went home with lots of new knowledge, plenty of happy memories and a list of 41 potential contacts with whom to share that next



Figure 2. Norway spruce cones and the High Tatras mountains on a bright frosty morning



Figure 3. Interpreting TZ staining patterns at the Forest Research Institute Liptovsky Hradok Slovakia



Figure 4. Thermotherapy of acorns at Semenoles Liptovsky Hradok



Figure 5. Tree seed analyst at Vlkolinec Slovakia

interesting tree seed testing anomaly!

A short photographic record of the meeting and 3-day tour is shown in Figures 1 - 5

Acknowledgements

Thanks go to all attendees for their active participation and involvement throughout the meeting.

Further thanks go to the chair persons, practical session leaders, speakers and demonstrators. The high quality of the meeting was a clear reflection of their considerable expertise, conscientious preparation and well developed communication skills.

Thanks also to Ing. Yveta Sefrnova, Ing. Miroslav Houba and Dr. Zdenka Polanecka

at the Agricultural Seed Testing Laboratory (CZDL03) we visited; to Ing. Zdenek Kiesenbauer of the Dendrological Gardens of the Research Institute of Ornamental Gardening; Ing. Zdenka Hlavova and Ing. Martin Plasil from the Tree Seed Centre in Tyniste nad Orlici; Ing. Katarina Chvalova and her colleagues from Semenoles (Slovakian Tree Seed Centre); and Dr. Elena Foffova and her colleagues from the Slovakian Tree Seed Testing Station (SKDL02).

Very special thanks go to Dr Zdenka Prochazkova and her colleagues from the 'Forestry and Game Management Research Institute' of the Czech Republic for organising such a successful, memorable and thoroughly enjoyable combination of events. ■

Table 1. Programme

Monday, October 20, 2003		
8:00-9:00	Registration	
9:00-9:20	Official opening	
9:20-9:40	Zdenka Procházková	Activities of the ISTA FTS Com 2001-02
Session 1		
9:40-10:10	Peter G. Gosling	Double the trouble and no current benefit - How to obtain more from 'double' germination tests
10:10-10:30	Gary Johnson	Paired germination tests in three pine species
10:30-10:50	Cofee break	
Session 2		
10:50-11:10	Gary Johnson, Ellen Chirco	Excised embryo tests of peach, apple and pear
11:10-11:30	S. Mugnaini, M. Nepi, E. Pacini, B. Piotto	Poor seeding in Junipers may depend upon non-specific pollination mechanisms
11:30-11:50	F. Pérez-García, M.E. González-Benito	Effect of temperature and various pretreatmens on seed germination of some <i>Halimium</i> and <i>Helianthemum</i> species
11:50-12:10	Zdenka Procházková	Handbook for Seedling Evaluation
12:10-13:40	Lunch	
Session 3		
13:40-14:10	D.G.W. Edwards	Breaking dormancy in tree seeds with special reference to firs (<i>Abies</i> species)
14:10-14:30	Zdenka Procházková	Ring test of <i>Abies</i> spp.: information on progress
14:20-14:40	Zdenka Prochazkova	Germination test: Evaluation of normal and abnormal seeds
14:40-15:00	Coffee break	
Session 4		
15:00-15:30	Peter G. Gosling	What are the differences between a 'germination' test and a 'viability' test?
15:30-16:00	D.G.W. Edwards	Kinetics of water absorption in fir seeds, and its implications for tetrazolium and excised embryo tests
16:00-16:20	Zdenka Procházková	Comparing viability and germination of European beech (<i>Fagus sylvatica</i> L.) seeds
Practical Part I		
16:20-18:00	Stefanie Krämer	Presentation of Tetrazolium HandbookTZ method presentation Practical training - TZ

Table 1. Programme (continued)

Tuesday, October 21, 2003		
8:00 - 13:00	Excursion	ÚKZUZ -ISTA seed testing laboratory for agriculture crops (CZDL03)
13:00- 14:30	Lunch	
Practical Part II		
14:30-16:00	Stefanie Krämer	Tetrazolium test: Evaluation of viability of <i>Abies</i> seed
	Lena Bezdeckova	Tetrazolium test: Evaluation of viability of <i>Fagus sylvatica</i> , <i>Prunus</i> , <i>Tilia</i> , <i>Acer</i> seeds
16:00-16:20	Coffee break	
Practical Part III		
16:20-18:00	Gary Johnson	Excised embryo test
	Lena Bezdeckova	Purity of conifer seeds
	Lena Bezdeckova	Germination of <i>Pinus sylvestris</i> and <i>Picea abies</i> (evaluation)
19:00	Official Dinner	
Wednesday, October 23, 2003		
8:30 -12:00	Excursion	Dendrological garden
12:00-13:30	Lunch	
Session 5		
13:30-13:50	Finnvid Prescher, Elisabeth Prescher	Testing forest tree seed in Sweden
13:50-14:10	Abdalla Abdelmonem	Survey of seed-borne diseases of some woody trees in Egyptian gardens
14:10-14:30	Elena Foffova	Evaluation of the ISTA comparative test for laboratories testing forest tree seeds (2001).
14:30-15:00	Zdenka Procházková	Proficiency testing programme
15:00-15:20	Coffee break	
Session 6		
15:20-16:00	Zdenka Procházková	EU Legislation on Marketing of Forest Tree Seeds: future needs; Future aims of activities of the FTS Com.; Tree seed testing in the Czech Republic

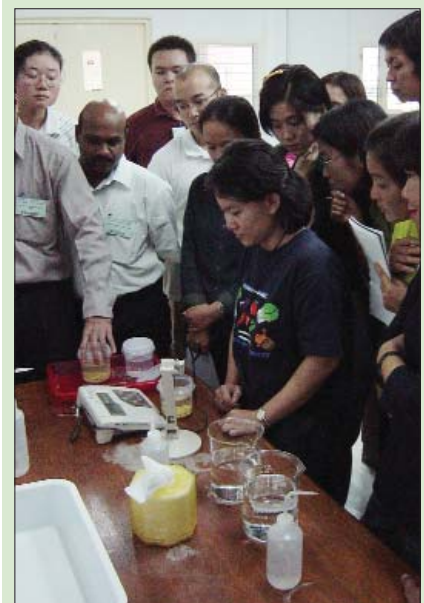
Table 2. List of Participants

Ilse Strohschneider	Austria	Norbert Frank	Hungary
Bernard Daigle	Canada	Patricia O'Sullivan	Ireland
David George W. Edwards	Canada	Pietro Civale	Italy
Jack Sutherland	Canada	Luigi Forte	Italy
Damir Drvodelic	Croatia	Fabio Gorian	Italy
Maja Gradecki_Postenjck	Croatia	Serena Lamastra	Italy
Lena Bezdecková	Czech Rep.	Beti Piotto	Italy
Zdenka Procházková	Czech Rep.	Jane Njuguna	Kenya
Sigrít Diklev	Denmark	Heidi Roeseck Bye	Norway
Lene Tjott Muller	Denmark	Piotr Mendelewski	Poland
Marianne Pedersen	Denmark	Barbara Pawlowska	Poland
Abdalla Abdelmonem	Egypt	Elena Foffová	Slovakia
Hanna Kortemaa	Finland	Gabriela Debnárová	Slovakia
Jouko Pajja	Finland	Luis Fernando Benito-Matias	Spain
Sakari Ponnio	Finland	Elena Gonzáles-Benito	Spain
Heli Saario-Poikulainen	Finland	Nieves Herrero-Sierra	Spain
Petra Glimm	Germany	Finnvid Prescher	Sweden
Ralph Jenner	Germany	Elisabeth Prescher	Sweden
Dieter Kaudel	Germany	Victoria Cunningham	UK
Stefanie Krämer	Germany	Peter Gosling	UK
Despina Paitaridou	Greece	Gary Johnson	USA

AVRDC - ARC / ISTA / APSA Seed Testing Workshop

Kasetsart
University, Thailand,
October 13 - 22,
2003

**By Murray Hill, ISTA
Representative**



The International Seed Testing Association (ISTA), the Asia and Pacific Seed Association (APSA) and the Asian Vegetable Research and Development Centre (AVRDC) through its Asian Research Centre (ARC) at Kasetsart University recently coordinated an International Seed Testing Training Course at the Kamphaengsaen campus of Kasetsart University. Held from 13 - 22 October, the Course attracted 18 partici-

pants from China, India, Indonesia, Japan, Taiwan, Thailand and Vietnam.

This Course was initiated and supported financially by AVRDC-ARC through its Director, Dr. Meisaku Koizumi and the Director of TVRC, KU, Dr. Sutevee Sukprakarn.

The participants, all from commercial seed companies, enjoyed a mix of lecture and practical classes on seed quality, seed testing and post-harvest seed technology. There was also major interest in the procedures and documentation necessary for the ISTA accreditation of company laboratories.

Resource persons involved were Professor Murray Hill and Mrs Karen Hill from New Zealand, representing ISTA, and Dr. Sutevee Sukprakarn, Dr. Sunanta Juntakool and Dr. Somsiri from Kasetsart University, Thailand. Extensive teaching notes and laboratory seed testing manuals were provided from the New Zealand Seed Technology Institute at Lincoln University. These were used by participants to build up a 'reference library' for their future use.

Exceptional laboratory and personal support was available from staff of the Tropical Vegetable Research Centre under the direction of Dr. Sutevee Sukprakarn, Mr. Prasert Prapanoppasin and their colleagues.

Topics covered included seed quality assurance, ISTA accreditation procedures, seed testing (sampling; purity; germination - including dormancy breaking methods, seedling evaluation and seed vigour); seed moisture; tetrazolium testing; seed pathology; seed drying and storage. Wherever possible, test species were chosen for their relevance to the participants - Bitter Gourd, Chinese Radish, Coriander, Corn, Cucumber, Kale, Lettuce, Marigold, Pepper, Soybean and Tomato.

A half-day was used to visit East-West Seed Company where the group was hosted by Mr. Michel Devarreware. This was a marvellous opportunity to see the development and implementation of an exceptional quality assurance philosophy and new seed drying, processing and testing facilities.

During the Course, the participants compared the effects of sun drying, shade drying and artificial drying on seed drying rate and quality in corn, brassica and soybean. The brassica dried in the sun reached a seed temperature of 56°C! It will be inter-



esting to see how good the seed samples taken home by the participants are when germinated in 3 months time!

The Workshop dinner was sponsored by Dr. Chairerg Sagwansupyakorn of Thai Seed and Agriculture Co. Ltd and was complemented by a slide show of the participants activities during the previous ten days - some technical, some humorous and some even showing accelerated ageing wrinkles!

Formal Course evaluation and informal feedback was very enthusiastic. The participants were clearly delighted by the improved knowledge base. Just as importantly, however, they spoke of their increased confidence in carrying out their work roles as seed analysts and seed business managers.

There is no doubt that this first Course under the support of ISTA / APSA and AVRDC should be the forerunner of similar activities in South and Southeast Asia in the future. ■



1st ISTA Moisture Testing Workshop

The Danish Plant Directorate

Lyngby, Denmark, November 3 -7, 2003

By **Harry Nijenstein**, ISTA Moisture Committee Chair

Participants

The first ISTA Moisture testing workshop ever was held in Denmark in November 2003. The 19 participants originated from 14 countries on three continents (Europe, Northern America, Australia/New Zealand). Governmental, private and company labs were all well represented.

Organisation and purpose

The workshop was very well organised by Jette Nydam and her staff. All went very smoothly: the welcome at the hotel, the daily train trip between the hotel and the Plant Directorate, the breaks and the lunches. Alterations in the program were accepted with great flexibility.

The main purpose of the program was to promote uniformity in seed moisture testing. This includes the exchange of information, and improvement of the present methods.

Program

The program was run by Jette Nydam and Harry Nijenstein. Covered were theoretical and practical exercises, lectures, and discussions. In addition visits to several departments of the Danish Plant Directorate were organised. One day was dedicated to external excursion.

Grethe Tarp, member of the ISTA Executive Committee and head of seed department at the Plant Directorate, started with a word of welcome, followed by an explanation of the work of the Danish Plant Directorate.

The first item in the program was called 'moisture in seed'. Background was given as to what types of water exist in seeds, and how it influences seed physiology and seed storage. Also purposes and methods of seed moisture testing were presented.

The first practical exercise was the demonstration of an oven test. Differences between this test and the test as done at the participants' lab lead to many in depth discussions. The existing methods for the oven method and for the moisture meters were extensively and in great depth discussed. How to make calibrations of moisture meters was exercised.



The 19 participants who attended the 1st ISTA Moisture testing workshop, held in Denmark in November 2003, originated from 14 countries on three continents (Europe, Northern America, Australia/New Zealand). Governmental, private and company labs were all well represented.

Henrik Josefsson of Foss lectured a session on moisture meters - principles, calibration and evaluation. Thereafter Jette Nydam explained how the 'Danish grain network' operates. The lively discussions on these subjects provided us with very useful information for improving the moisture chapter in the Rules.

Much time was spent on quality assurance, by both lectures and practical exercises (soft wheat test, monitoring of performance),

again followed by discussions. As the present Rules chapter for moisture does not yet contain much information on this, the discussions again provided useful information for the Rules or for the Handbook.

The present activities and working groups of the ISTA Moisture Committee were presented and discussed. Anders Lomholt of the Danish Plant Directorate presented the results of one of our working groups, dealing with 'new methods and methods for new

Lectures covered topics such as moisture in seed, moisture meters, quality assurance and new methods and methods for new species. The mix of countries and of governmental, private and company labs was very stimulating, especially throughout the discussions.



species'. From his presentation we again learned that the present Rules will have to be improved extensively.

Validation of new species and/or methods and classification of methods were also discussed. The mix of countries and of governmental, private and company labs was very stimulating, especially throughout the discussions.

In addition we had lively discussions on what should be the content of a Handbook for seed moisture testing, and on future developments in seed moisture testing. Input from the participants made it possible to develop a draft table of contents for the Moisture testing handbook.

One day out of the four-day program was used for excursions. In Roskilde we started with an explanation of shipbuilders from the past: the Vikings. Next, at the seed company DLF Trifolium, the Director responsible for the ISTA accredited laboratories of DLF, Torben Borggaard, gave an outline of the

main activities and history of the company. In addition DLF's methods of moisture testing were demonstrated.

In the afternoon Foss was visited. Foss is a manufacturer of electric moisture meters, as explained by Kirsten Klitgaard, Sales Manager of Foss. Our special thanks go to Foss, as they sponsored the Workshop dinner as well.

For the organisers the evaluation was important, as this was the first ISTA seed moisture workshop ever. All items in the program were rated by the participants as either excellent, good, average, or poor. Fortunately hardly any ticks were found in the columns for average or poor. Most items were rated as excellent, some as good. Some details can still be improved, but overall organisers and participants went home satisfied.

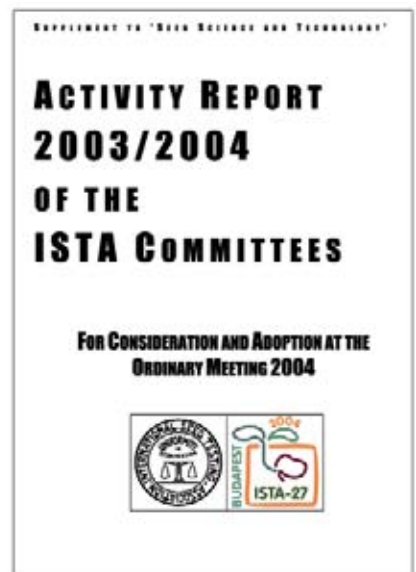
What's next?

The next workshop will probably be organised in 2004, either in Thailand or New Zealand. ■

Press Release

Activity Report 2003/2004 of the ISTA Committees

Cited and Published by the ISTA Secretariat



This document contains the 2003/2004 Report of the Executive Committee, the 2003/2004 Report of the Secretary General and the 2003/2004 Activity Report of the Technical Committees as approved by the Executive Committee of ISTA.

The Reports published in this document are subject to adoption by the Membership at the upcoming Ordinary Meeting of the Association, which is the 27th ISTA Congress 2004 in Budapest, Hungary, May 20 and 21.

Available as of March 2004 from the ISTA Secretariat.

Price: CHF 70.00* (approx. US\$ / EUR 49.00)

Note: This publication will be delivered as a free service to all ISTA Members, Designated Authorities and Technical Committee Members. ■

*Or free download from the ISTA Website



The first practical exercise was the demonstration of an oven test.

Differences between this test and the test as done at the participants' lab lead to many in depth discussions. The existing methods for the oven method and for the moisture meters were extensively and in great depth discussed.

The lively discussions on these subjects provided us with very useful information for improving the moisture chapter in the Rules. ■



1st Announcement - ISTA Workshop on Statistical Aspects of GMO Detection

Toulouse, France, April 1 - 2, 2004

Sylvain Grégoire, ISTA Statistics Committee Chair

ISTA is organising a workshop with the aim to help laboratories to address the test planning, and the use of results, on GM detection in seeds.

The aim of the workshop is to give and exchange information on matters that have been mentioned by laboratories which already participated to the ISTA proficiency tests, or intend to join.

Lectures will be accompanied by practical use of software which is available on ISTA website, such as seedcalc for instance.

Not only ISTA proficiency tests will be addressed, but GM tests on seeds in general. Other ISTA workshops deal with the technical aspects of detection by laboratories; laboratory technique will not be demonstrated in this workshop.

Workshop Content

See the list of topics mentioned below.

Practical Work

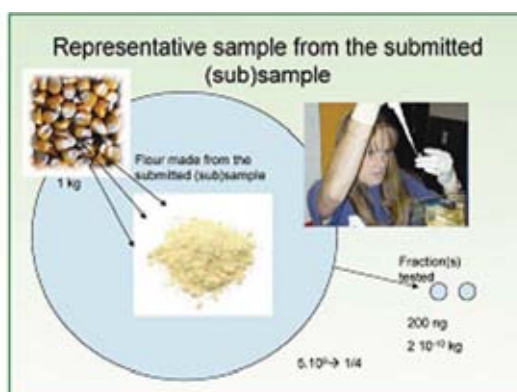
All participants will practice computer use software on simple examples.

Presenters of the Workshop

The workshop will be presented by Sylvain GREGOIRE (France, GEVES), Kirk REMUND (USA, Monsanto) and Jean-Louis LAFFONT (France, Pioneer) who are the core of the ISTA STA-GMO TF (sub-group of the ISTA Statistics Committee dedicated to help the ISTA GMO Task Force, in particular the Proficiency test sub-group).

Location

The workshop will take place at the site of Pioneer Génétique in Aussonne (in the vicinity of Toulouse, France). Hotel accommodation will be near the working place and the price is about 90 Euros per night.



List of Topics

- Obtain an estimate of % of GM in a sample
- Introduction on uncertainty of measurement using ISO 17025
- Robustness of testing plans (tolerance to false positive and/or false negative rates)
- Determination of appropriate testing plan(s) to thresholds or quality levels
- Check of purity of reference material
- DG SANCO testing plan for GM seeds (example of test in two steps)
- Repeatability (measure variability in a lab) and reproducibility (measure variability in a set of labs) for quantitative results using ISO standard 5725 (quoted in ISO 17025)
- Distributions usually found in living material and used in computations (Binomial, Normal,...)
- Data checking (outliers or "suspected error" points)
- Limit of detection, limit of quantification
- Example of computations from raw results obtained in a test
- Principle of statistical test and associated risks (alpha, beta) t test used as an example

Announcement - ISTA Tetrazolium Workshop

Taipei, March 1 - 5, 2004

Norbert Leist & Stefany Krämer, ISTA Tetrazolium Committee Members

The ISTA Tetrazolium Committee organised for seed testing analysts actually working in a seed testing laboratory, a Tetrazolium Workshop which was held at the National Taiwan University, Taipei, from March 1 - 5, 2004.

The general subjects covered at this event are as follows:

Lectures

- Presentation of ISTA
- Presentation of the ISTA TEZ Committee
- Presentation of the new ISTA Tetrazolium Handbook
- Tetrazolium test: sample size, statistical basis for test carried out on four replicates of 100 seeds, tolerance tables for 100, 200 and 400 seed tests, maximum tolerated range between four replicates of 100 seeds in germination tests and its use for assessing tolerances between replicates of tetrazolium tests and use of sequential testing procedures
- Relationship between germination testing and viability testing
- Explanations of symptoms (staining patterns) caused by different factors such as heat damage, water damage, mechanical damage, freeze injury, influence of micro organisms
- Tetrazolium as an indicator of vigour
- Quality Assurance and Health and Safety
- Tetrazolium salts and biochemistry of tetrazolium reduction
- History of Tetrazolium testing

Hands-on activities

- Species with a method **described** in Table 6A (ISTA Rules, 2004). Procedures for TEZ tests on for example *Oryza sativa*, *Triticum aestivum*, *Lolium sp.*, ...
- Species with a method **not described** in Table 6A (ISTA Rules, 2004). Procedures for TEZ tests on for example *Brassica sp.*, *Phaseolus sp.*, *Allium cepa*, *Tagetes sp.*, *Pisum sativum*,...

Announcement - ISTA Seed Health Committee Workshop

Novi Sad, Serbia and Montenegro
May 6 - 11, 2004

Mirjana Milošević, ISTA Member

ISTA SHC Committee, National Laboratory for Seed Testing and Institute of Field and Vegetable Crops have the pleasure of inviting you to attend their workshop on seed health testing which will be held in Novi Sad, Serbia and Montenegro, from May 6 - 11, 2004.

Organizers

Mirjana Milosevic, Director of National Laboratory for Seed Testing and Stevan Masirevic, Deputy Director of Institute for Field and Vegetable Crops.

Subject

The subject of the workshop is economically important diseases of major crops in this part of the world (corn, wheat, barley, sunflower, vegetables). There will be lectures on specific fungi, followed by practical work on recognizing parasites on seed, nutritive media and under the microscope. This workshop is a part of pre-congress ISTA activities.

Programme

6 May - Maize diseases, *Fusarium* sp., *Drechslera* sp.

Lecturer: **Dr Denis McGee**, Seed Science Centre, Iowa State University, USA and **Dr Bo ana Purar**, Institute for Field and Vegetable Crops, Novi Sad, SCG

7 May - Sunflower diseases - *Phomopsis* sp., *Botrytis* sp., *Orobache* sp., *Plasmopara helianthi*, *Rhizopus* sp., *Alternaria* sp.

Lecturer: **Dr Michael Guenard**, GEVES, National d'Essais de Semences, France and **Dr Stevan Maširevic**, Institute for Field and Vegetable Crops, Novi Sad, SCG

8 - 9 May - Workshop tour

Institute for Field and Vegetable Crops, Novi Sad, Agricultural museum in Kulpin, Broom factory in Backi Petrovac and Monastery on the Fruška Gora mountain

10 May - Wheat and barley diseases - *Fusarium* spp., *Pyrenophora* sp., *Tilletia* sp., *Ustilago* sp.

Lecturer: **Mrs Valerie Cockerell**, Official Seed Testing Station, Edinburgh, UK and **Dr**

Radivoje Jevtic, Institute for Field and Vegetable Crops, Novi Sad, SCG

11 May - Carrot disease - *Alternaria* sp. "Importance of seed-borne *Alternaria* spp. in carrot" (Occurrence of *Alternaria* spp. in carrot seeds, disease problems at carrot production chain, including organic farming)

Lecturer: **Prof Dr Krysna Tilkowska**, Agricultural Faculty, Seed Science Department, Poznan, Poland

Soybean diseases - *Phomopsis* spp.

Lecturer: **Prof Dr Stevan Jasic**, Institute for Field and Vegetable Crops, Novi Sad, SCG

Travel information

The airports nearest to Novi Sad is in Belgrade (80 km away) and Budapest. Bus transfer to Budapest at the end of the Workshop may be organized on request. It will be charged separately.

Accommodation

A list of hotels and boarding houses located in Novi Sad can be requested from the organizers. The costs of lodging are not included in the registration fee.

Venue

The Workshop will take place at the headquarters of Institute for Field and Vegetable Crops located in downtown Novi Sad.

Registration fee

The registration fee of 160 EUR/USD covers the costs of workshop materials, coffee breaks, lunches, welcome party and workshop tour.

Contact Information

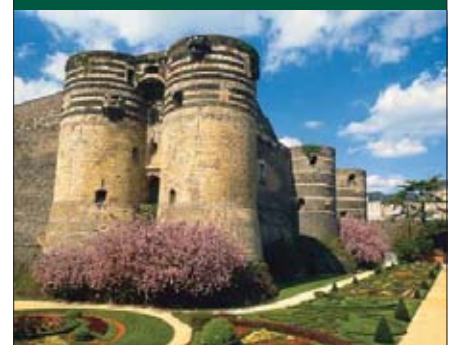
Mirjana MILOŠEVIĆ
National Laboratory for Seed Testing
21000 Novi Sad
M.Gorkog 30
Tel: 381 21 421 248
Fax: 381 21 421 249
e-mail: mirjana@ifvcns.ns.ac.yu



5th ISTA - SHC Seed Health Symposium

Angers, France

May 10 - 13, 2005



List of topics for 5th ISTA Seed Health Symposium

- Innovations in seed health testing
- New diseases and emerging seed borne pathogens
- Methods of standardisation and evaluation of comparative tests
- Seed contamination from infected plants
- Chemical and physical seed treatments
- Seed health and the international movement of seeds
- Quality assurance in seed health testing

Contact details

Véronique BINOIT
GEVES - SNES

Rue Georges Morel - BP 24
49071 Beaucouzé Cedex - France

Tél. 33 (0)2 41 22 58 03

Fax 33 (0)2 47 22 58 01

veronique.binoit@geves.fr





ISTA Purity Workshop

Pre-Congress Purity Workshop - in connection with the 27th ISTA Congress

Budapest, Hungary, May 11 - 12, 2004

Maria Mannino, ISTA Purity Committee Vice-Chair and
Zita Ripka, ISTA Purity Committee Member



The ISTA Purity Committee is organizing a workshop to be held at the National Institute for Agricultural Quality Control.

The workshop is a part of pre-congress ISTA activities.

The official language of the workshop will be English

REGISTRATION FEE: **EUR 100.00** per participants

Including: the costs of the official programme of the workshop, lunches and coffee breaks.



Contact

Zita Ripka

e-mail: ripkaz@ommi.hu
tel: 36-1-336-9329
fax: 36-1-336-9096

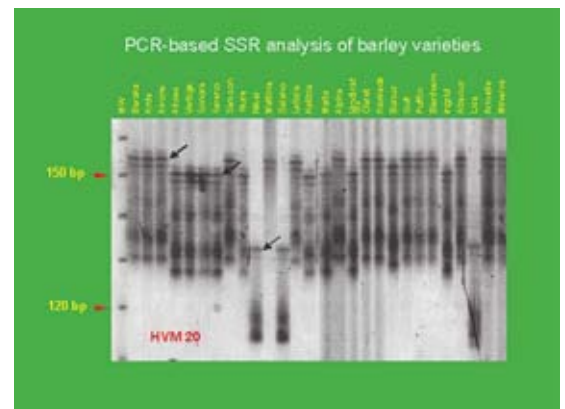
Contents

- ISTA rules for purity analysis
- Use of Pure Seed Definitions
- Blowing of *Poaceae* Seeds
- Difficulties of seed identification of *Medicago* spp.
- Difficulties of seed identification of *Cucurbitaceae*
- Difficulties of seed identification of *Bromus* spp.
- Difficulties of seed identification of *Triticum* spp.
- ISTA Rule Changes Chapter 3 and Annexe

4th ISTA /FAO Workshop on Electrophoretic & DNA-based Methods for Varietal Verification and GMO Detection

Ljubljana, Slovenia, July 10 - 14, 2004

Jelka Sustar-Vozlic, Agriculture Institute of Slovenia and
Bettina Kahlert, Head of ISTA Technical Committee Administration



The International Seed Testing Association (ISTA) and the Food and Agriculture Organization of the United Nations (FAO) would like to announce the 4th ISTA/FAO Workshop on Electrophoretic and DNA-based Methods for Varietal Verification and GMO Detection.

This workshop is for seed testing analysts from laboratories located in the Eastern European region. ISTA together with FAO have already held GMO Verification workshops in South American, African and Asian regions, while a workshop for the Middle East region is in the planning stage.

The aim of the workshop is to train the seed technicians in methods for the verification of species, cultivars and hybrids as well as for qualitative and quantitative GMO detection.

Lecturers

Part 1: Electrophoretic Methods for Varietal Verification

- Prof. Dr. Norbert Leist, ISTA President
- Mr. Rainer Knoblauch, ISTA Variety Committee Member

Staatl. Landw. Untersuchungs- und Forschungsanstalt Augustenberg, Karlsruhe, Germany

Part 2: PCR based Methods for GMO Detection

- Dr. Enrico Noli, ISTA GMO TF Member
- Dr. Massimiliano Ballardini

Lab. di Ricerca e Analisi, Sementi LaRAS, DiSTA, Università di Bologna, Bologna, Italy



Considered Workshop Content

The workshop shall provide general information regarding the possible applications and hand-on experience of electrophoresis and PCR-based methods in the field of varietal verification and GMO detection. These will cover:

- Object, field of application and general principles of the verification of species and cultivars
- Seed storage proteins analysis
- Sample preparation and DNA extraction
- PCR analysis: 1) Basis, 2) Molecular markers, 3) PCR-based methods for GMO detection
- Introduction in other methods such as ELISA and bioassay

Considered Practical Work

- Isoelectric Focusing in Ultrathin layer (IEF) of seed storage proteins: Protein extraction, gel preparation, fixation, staining, destaining and evaluation of the gels
- Testing of seed storage proteins with PAGE; SDS; Isozymes: Protein extraction, gel preparation, fixation, staining, destaining and evaluation of the gels
- DNA extraction, UV spectrometry
- Agarose gel electrophoresis of extracted DNA
- Amplification of endogenous invertase gene
- PCR for qualitative detection of *CaMV 35S* promoter, *epsps* gene and *cryIA(b)* gene
- Real time PCR

The Ring Test Program - Benefits and Difficulties

Proficiency Test in the Balkan Countries

By **Branislava Opra**, Quality Manager, Maize Research Institute Zemun Polje, Belgrade, Serbia & Montenegro



A National Ring Test Program has been in place in Serbia since 2000. The idea to spread out the national Ring Test Program to a regional level, was not only due to a need for greater staff control. The goal was mainly to broaden our professional ties and to strengthen the relationships among colleagues from Slovenia, Croatia, Macedonia, Serbia and even Israel.

The introduction and management of ISO 17025 Standards at the Seed Testing Laboratories (STL) presumes the monitoring of laboratory staff competence and their testing skills. Participants of the ISTA Advanced Quality Management Workshop, held in Ljubljana, Slovenia, in November 2002, discussed the importance of different types of both intra-laboratory (blind and check) testing and inter-laboratory comparative testing, such as Ring Test. It was definite that the frequency of staff controls should be around 5% of the total testing for each year, regardless of the ISTA Proficiency Test Program. It was obvious that there was a space for increasing the percentage of staff controls.

National Ring Test Program

A National Ring Test Program has been in place in Serbia since 2000, when the ISTA accredited STL of the Maize Research Institute Zemun Polje, Belgrade, agreed with two other ISTA accredited laboratories from the country to organize three inter-laboratory tests each year. The initiative encompassed also other non-ISTA STL's in the country. The aim was to upgrade the general proficiency level of seed testing staff and to emphasize the importance of good laboratory practices and reliability of seed test results.

Regional Ring Test Program

The idea to spread out the national Ring Test Program to a regional level, was not only due to a need for greater staff control. The goal was mainly to broaden our professional ties and to strengthen the relationships among colleagues from Slovenia, Croatia, Macedonia, Serbia and even Israel. We expected that benefits for all participants would be reflected through healthy competition, not only in the case of STL's in the role of participants, but also as test organizers. This was a positive challenge and we were glad that it was so readily accepted.

The Ring Test was organized based on the principles of the ISTA's Proficiency Test: ISTA accredited laboratories from Serbia are responsible for the preparation of one test per round, each. Beforehand, the Ring Test Plan was defined for the next two rounds (two year period), i.e. the schedule of samples distribution and plant species list. The discreet right of each organizer is to choose the participant labs participating in a specific test, so that the number of non-ISTA labs might not be the same in each ring test. With the upgrading of the national Ring Test Program to a regional level, the STL of the Maize Research Institute Zemun Polje did not dismiss all non-ISTA participant labs. All those which had proved competence on the basis of their previous Ring Test results continued to participate.

Sample preparation

The first agreed tests for the first year round were purity, germination and other seed determination for *Hordeum vulgare*. The sample preparation was done by checking the purity and germination of the selected seed lots. Inert matters were those which already existed in samples and/or were artificially made by cutting of single seeds. Inert matters were measured before being added to samples, in order to have preliminary knowledge of the inert matter percentage in each sample. These data are of no importance for our participants, since the calculation is done by the comparison with

the overall mean. However, these data are important for the test organizer, to check the reliability of the sample preparation process.

On the other hand, for the other seed determination test there are established expected values, i.e. the number of seed added to samples. If the participant lab finds some other seed that is not expected, this is not taken into account and does not influence the laboratory performance regarding the other seed determination test, but it might influence the purity test results. To avoid this problem, a test organizer should be certain that before adding the other seed fraction, the sample consists only of the pure seed fraction of the selected species.

Calculation program

A calculation program was developed in Microsoft Excel by statisticians from the Maize Research Institute Zemun Polje and from the Institute of Field and Vegetable crops, Novi Sad. The calculation method is similar to the existing calculation for the ISTA's Proficiency Test and is based on the overall mean and standard deviation of all participants' results. Results are presented by means of the normalized scores, when the normalized score of an overall mean is zero ("0") and by deviations of each lab result (normalized score) from it. Histograms are made for six classes (-3, -2.7, -1.3, 1.3, 2.7 and 3), for each sample (S_1 , S_2 and S_3) and for the following observed parameters:

- germination, presented by normal seedlings (fig. 2), abnormal seedlings (fig. 3) and dead seed (fig. 4)
- purity, presented by pure seed (fig. 6), inert matter (fig. 7) and other seed (fig. 8).

FIGURES

The results are also presented in the form of one general diagram illustrating the position of each observed parameter for each sample (fig. 1, 5). Unfortunately, we still do not have the software possibilities to present the continuous performance of the participants over the years.

Verification of the calculation matrix

After the first successfully completed Ring Test, Mrs. Lea Mazor, Official STL, Israel, suggested the exchange of the calculation program, in order to implement it in their internal staff control. It was clear that, for this purpose, the Ring Test calculation matrix needed to be verified by a third party. The expertise of Dr. Michael Kruse, ISTA Bulking and Sampling Committee Chair, was consulted for this purpose. In his own words: "Congratulations, this is a nice study and the evaluation is appropriate. In the ISTA Proficiency Tests is made a test for outliers before the normal scores are calculated but with 10 laboratories it is quite difficult to identify outliers correctly, so in that case it is more appropriate to take all data as you did."

Since we have a small data set (10 to 15 participant labs) Dr. Kruse advised us to broaden the classes in the histogram, to take only four classes (from -2 to 2). That should result in a smoother distribution. He also

recommended to test the standard deviation, since it may happen that results from all participants are within tolerances but tolerances are actually very wide and therefore the result is not correct.

Participant's feedback

After the first test, we asked our participants for some feedback. In the words of Mrs. Mirta Culek, State Institute for Seed and Seedling, Croatia: "For us, as a very young laboratory, the ring test is an excellent opportunity to gain experience as well as confidence by comparing our test results with the results of laboratories with longer tradition. My lab is the only ISTA accredited lab in Croatia and previously we did not have partners for such tests. Cooperation of the participants of the ring test is not limited to just testing the samples, but also includes exchange of information and advice.

This Ring Test had a very good purity part, with other interesting seeds added, as well as tricky broken seeds. But, the germination rates of all three lots were almost the same.

It would be great if labs responsible for organizing forthcoming rounds could find seed lots that differ in germination rates. That would give us all a chance to compare our germination results for seed lots of different quality levels."

Initial experiences: organizer and participant

In the first place, we discovered that for organizing the Ring Test we do not need sophisticated statistical software, having a copy of Microsoft Excel and the good will to invite people to join it sufficed!

Organizing the Ring Test, however, revealed some weakness in our laboratory's operations. Though we strictly followed our Standard Operation Procedure for the Ring Test sample preparation, we discovered, as many times before, that a human factor is crucial for the successful laboratory performance. For example, while our laboratory was using the old name of *Bilderdikya convolvulus* for *Polygonum convolvulus*, some

General germination results

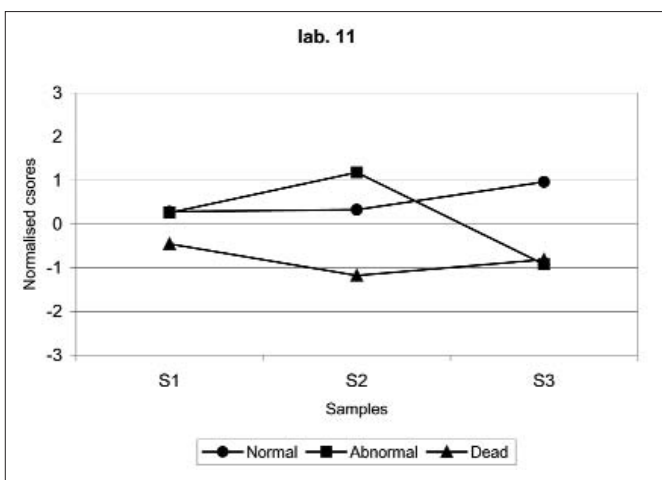


Figure 1.

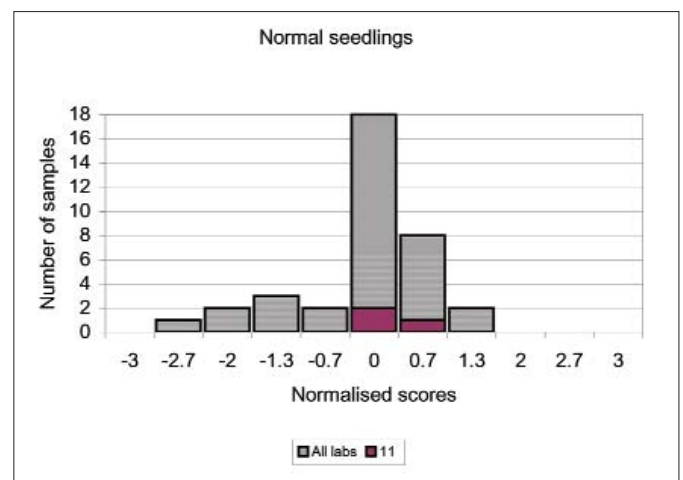


Figure 2.

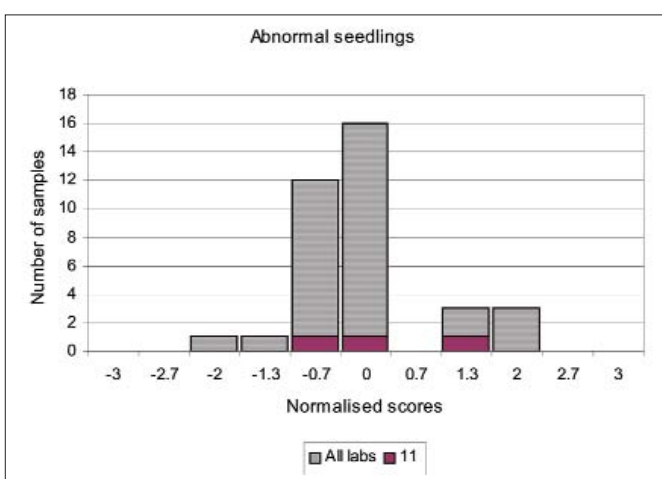


Figure 3.

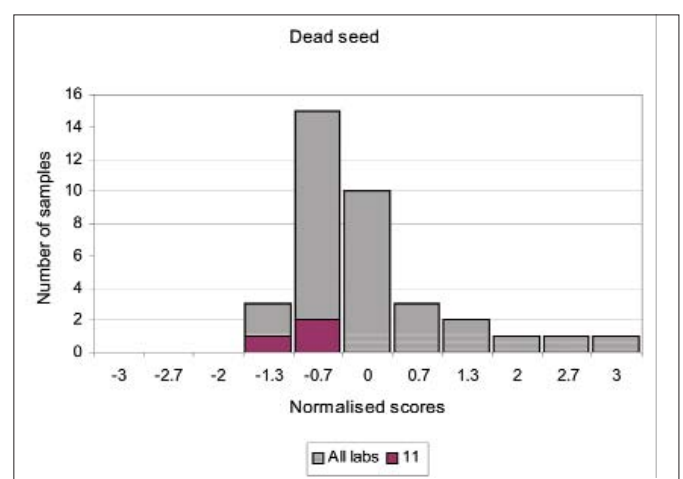


Figure 4.

participants named it as *Falopia convolvulus*. In later discussions, we all became aware of the importance of being up to date with our referent collections. Also, more attention should be focused on the addition of grass species seed in the samples, whether they contain caryopsis or not, i.e. whether they should be classified as other seeds or as inert matter. Such an organizer's oversight is the cause of variation in participant's results.

One additional source of difficulties is related to the dispatch of samples. Despatch by DHL is of course faster and more secure than by regular mail, especially when it is known that all participants should receive samples in short time. This issue is even more important in the case of extreme weather conditions, such as those present in the summer 2003, so that at the end of the test, results could be compared. Unfortunately, for labs with small budgets, DHL service might be too expensive, and dispatch could thus become a strong limiting factor for success of the Ring Test Program. Despite of

these hopefully minor hiccups, the outcome of Ring Test Program is quite positive. We exchanged many good ideas through mutual communication. The Ring Test aroused the awareness of the position of customers, a role that all participants emulated in this type of cooperation. Like with clients in everyday practice, the Ring Test opened the possibilities for feedback, complaints, follow-ups and improvements. We discovered that it is much harder and a greater responsibility to be an organizer than simply to await the arrival of samples. However, it is also a professionally rewarding experience from which laboratories can learn a lot. The future plan is to give the opportunity to other ISTA laboratories from the region to participate in the Ring Test preparation. Also, we plan to improve calculation matrix for germination, by adding the categories of fresh and hard seeds. That should enable us to achieve higher precision results.

Acknowledgement

I wish to express my sincere gratitude to all

of you who have been involved in our activities in one or another way. I thank Dr. Michael Kruse for kindly evaluating the calculation program, to our statisticians who developed it, to all of our colleagues who wholeheartedly participated and gave us their comments and to Ms. Martina Rösch for offering me the opportunity to write this article and share our experiences from Ring Test Program with the wider ISTA community. Many thanks! ■

Contact Details

Branislava Opra, M.Sc.
Seed Testing Laboratory YUDL03
Maize Research Institute Zemun Polje
Slobodana Bajica 1
11 000 Belgrade
Serbia & Montenegro

Phone +381 11 3754 989
Fax +381 11 3754 994
e-mail bopra@mrizp.co.yu

General purity results

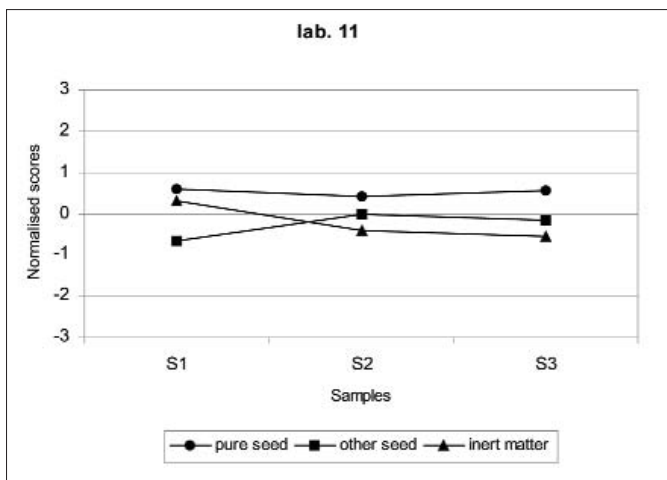


Figure 5.

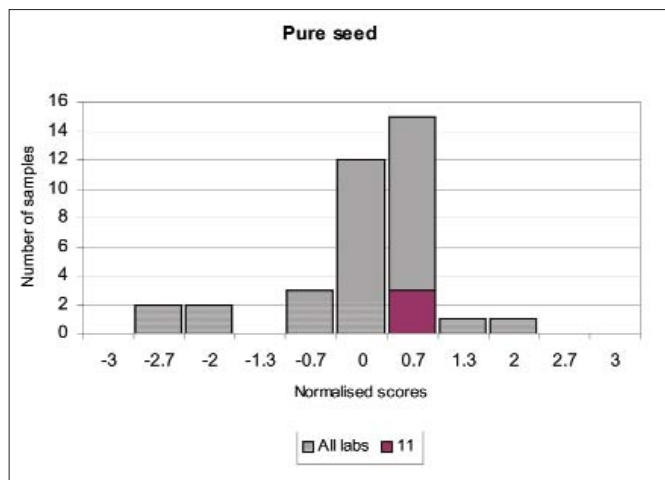


Figure 6.

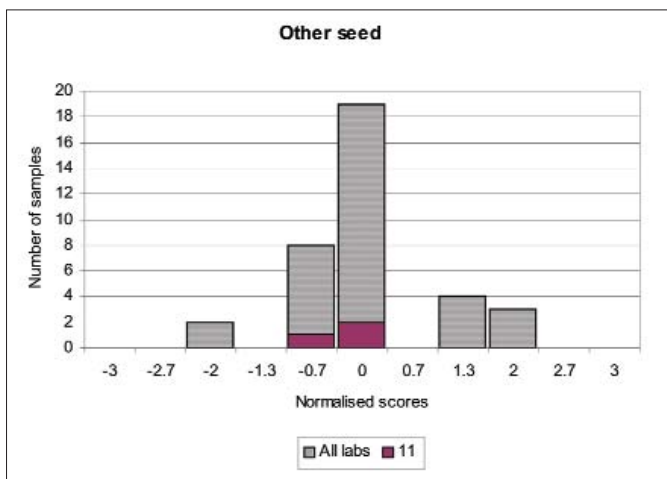


Figure 7.

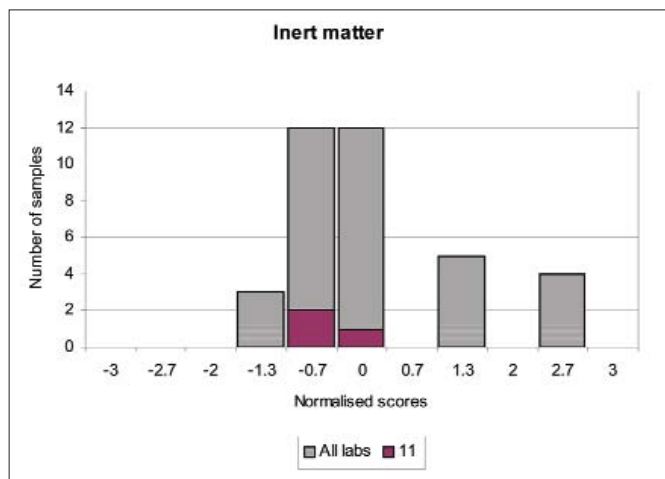


Figure 8.

ISTA/ICARDA/FAO/GTZ QA Workshop in Cairo

Cairo, Egypt, November 30 - December 4, 2003

By Gerhard Schuon, ISTA Accreditation Department

The workshop aimed to provide insight into quality assurance in seed testing laboratories for participants from West Asia and North Africa (WANA Region).

More than twenty professionals from ten different countries, from Morocco to Afghanistan, from Turkey to Sudan, participated and contributed with their experiences to a successful event.



In cooperation with ICARDA (International Centre for Agricultural Research in Dry Areas) a Quality Assurance Workshop was held in Cairo, Egypt. Funding was provided by FAO and GTZ. Local organisers from the Central Administration for Seed Certification (CASC) were supported by the GTZ Seed Certification Project and the Giza Central Seed Testing Laboratory; both located under one roof at CASC.

The workshop aimed to provide insight into quality assurance in seed testing laboratories for participants from West Asia and North Africa (WANA Region). At the same time this meeting intended to initiate a fruitful exchange between countries that have had different exposure to quality assurance in seed testing. More than twenty professionals from ten different countries, from Morocco to Afghanistan, from Turkey to Sudan, participated and contributed with their experiences to a successful event.

The Scottish Seed Testing Laboratory in Edinburgh (GBDL04) deployed a technical subject matter specialist, Ms C. Cadger, whereas ISTA sent Mr. G. Schuon to cover the general quality management aspects and the ISTA Seed Testing Laboratory Accreditation Standard.

Next to general principles in quality management and their relevance in a laboratory environment, the ISTA Accreditation system was outlined. Specific requirements of the ISTA Accreditation Standard were presented and the technical aspects were looked at in practical sessions. The vicinity to the ISTA accredited laboratory in Giza and the openhearted cooperation from its employees did contribute greatly to make the practical sessions a success.

Next to general principles in quality management and their relevance in a laboratory environment, the ISTA Accreditation system was outlined.

The exercise on auditing demonstrated the importance of operations and procedures being clearly described and that it is essential for a laboratory to have its staff adhere strictly to these procedures.

After more than four days circling around practical and theoretical aspects of quality

management in seed testing laboratories the participants felt that most of their expectations regarding information on quality management, ISTA laboratory accreditation and experiences from accredited laboratories were fulfilled.

In the final evaluation, none of the activities of the workshop were rated "non useful" by the participants; some indicated that more practical exercises and more time in general for a workshop of that kind would be beneficial.

In the final session participants committed themselves to stay in contact and those with more experience volunteered to assist other laboratories from the region on their way to implement a quality management system and eventually seek ISTA accreditation.

Next to the good working atmosphere, the participants' enthusiasm and the effective organisation, the venue for the workshop provided more than adequate facilities and delectable catering. In contrast to long working hours we were given the chance to visit the famous Pyramids in a nocturnal laser show and we had an enjoyable dinner on a Nile boat, following an invitation by ICARDA. ■

Vigour Testing - Proficiency Test for the Conductivity Test for *Pisum sativum*

By Alison A. Powell, ISTA Vigour Committee Chair

The first proficiency testing of a vigour test, the Conductivity Test for pea (*Pisum sativum*) took place in spring 2003. This was considered a trial proficiency test, which would begin to identify the standards by which laboratories would be assessed in their completion of the test. Several rounds of testing may have to be completed before such standards are set. All ISTA laboratories that test the germination of pea were asked if they wished to participate, whether they were experienced in completing the conductivity test and how many samples they tested per year. Twenty-two laboratories chose to take part; five laboratories tested between 60 and 300 samples per year; three tested up to 20 samples. The remainder did not provide any information whether or not they were experienced in completing the test.

The Processors and Growers Research Organisation (PGRO), UK provided three commercial seed lots of *Pisum sativum* that were identified as having high, medium and very low vigour on the basis of their conductivity test in autumn 2002. PGRO had previously taken part in the comparative testing that led to the validation of the Conductivity Test. Sub-samples were prepared in Aberdeen following the guidance of the Proficiency Test Committee and ten randomly selected sub-samples were tested in Aberdeen to confirm the homogeneity of the whole seed lot sample. The remaining samples were sent to the ISTA Secretariat for distribution.

Laboratories were asked to complete the test on four replicates of 50 seeds, following the directions in Chapter 15 of the ISTA Rules, and to calculate the conductivity for each replicate as described. The laboratories returned the data for the seed moisture content and both the conductivity for each replicate and the mean result for each seed lot.

All laboratories reported moisture content values for the three lots that fell within the range of 10 to 14% that seeds should have when used in the conductivity test. Thus no adjustment of seed moisture content was necessary before testing.

The mean conductivity values (including the 10 sub-samples tested in Aberdeen) for the three seed lots were 14.4 $\mu\text{S cm}^{-1}\text{g}^{-1}$ (lot 1), 55.3 $\mu\text{S cm}^{-1}\text{g}^{-1}$ (lot 2) and 24.6 $\mu\text{S cm}^{-1}\text{g}^{-1}$ (lot 3) indicating that the lots had high, very low and medium vigour levels respectively (Table 1). Comparison of the replicates within each laboratory revealed that all were within the tolerance levels of the ISTA Rules. In addition, the mean data for lots 1 and 3 obtained from the different laborato-

The first proficiency testing of a vigour test, the Conductivity Test for pea (*Pisum sativum*) was considered a trial proficiency test, which would begin to identify the standards by which laboratories would be assessed in their completion of the test. Several rounds of testing may have to be completed before such standards are set.

ries were also within tolerance. This was not the case for seed lot 2, which gave a conductivity reading that was greater than that which would be acceptable for commercial seed in the UK and which also fell above the data within the tolerance tables. It would

also be expected that the germination of this seed lot was below 80%, although this was not tested. Seed lot 2 was initially selected as an example of a seed lot with very low vigour. It is evident that such a lot should not be used in a proficiency test, as it is likely to be at the margin of acceptability for commercial use. However, in cases where the mean conductivity of lot 3 fell within the range of the tolerance tables, the four test replicates within each laboratory were within tolerance.

Statistical analysis of the conductivity data was completed by Sylvain Gregoire of the Statistics Committee. Repeatability and reproducibility values were computed as described in ISO 5725-2 and h and k tests were used to identify deviating laboratories.

Comparison of the standard deviation for repeatability within laboratories revealed the lowest standard deviation in seed lot 1, followed by lot 3 then lot 2. An increase in conductivity as vigour declines is typically associated with an increased standard deviation, a measure of repeatability. Not surprisingly, the standard deviation for reproducibility between laboratories also increased as conductivity increased (Table 1).

Comparison of h and k values reveals the extent to which data from the individual laboratories differs from the mean. The extent to which data observed in one labora-

Table 1. Mean conductivity readings and standard deviation values for repeatability within laboratories (sr2) and reproducibility between laboratories (sR2). Data is presented is the mean of 28 sub-samples (18 participating laboratories plus 10 sub-samples tested in Aberdeen)

Seed lot	Mean conductivity ($\mu\text{S cm}^{-1}\text{g}^{-1}$)	Repeatability within labs (sr2)	Reproducibility between labs (sR2)
1	14.4	0.88	1.20
2	55.3	2.72	5.64
3	24.6	1.81	2.22

tory differs from the mean of all the values is indicated by the h value (Figure 1). There were only four instances, out of 84, in which the h value for any seed lot was significantly greater than the mean of all lots (Figure

This trial proficiency test provides useful data that can be combined with that from subsequent tests to produce guidelines for the evaluation of a laboratory's ability to complete the conductivity test to a satisfactory standard.

1). In laboratory 8 the h values recorded for lots 1 and 2 were significantly greater than the mean (Figure 1) and this laboratory also recorded a conductivity reading greater than the mean for lot 3, although this was not significantly greater. This may suggest that this laboratory tended to overestimate the conductivity. Other significantly higher h values were found only for lot 2 in laboratory 32

and lot 3 in laboratory 15 (Figure 1).

The k values reveal the variability of the data compared to the mean variability (Figure 2). Significant differences in variability were found in four instances only (out of 84) and in three cases these occurred for the very low vigour lot 2 in laboratories 9, 20 and 25 ($p < 0.05$) and the fourth for lot 3 in laboratory 29 ($p < 0.01$). Results for lot 2 should not however be used to indicate that there were differences in the variability between laboratories, given the very low quality of this lot.

The results of this first proficiency test were very encouraging. There was a wide range of experience amongst the laboratories participating and yet all data for lots 1 and 3 were within tolerance, there was good laboratory repeatability and similar levels of variability occurred within the laboratories. In conclusion, this trial proficiency test provides useful data that can be combined with that from subsequent tests to produce guidelines for the evaluation of a laboratory's ability to complete the conductivity test to a satisfactory standard. ■

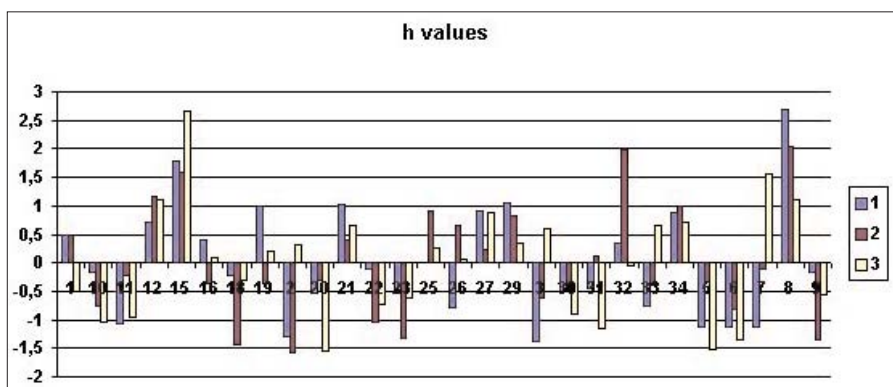


Figure 1. h values for 28 conductivity readings of three seed lots. Values above and below zero indicate a conductivity reading greater or less than the mean of all lots respectively.

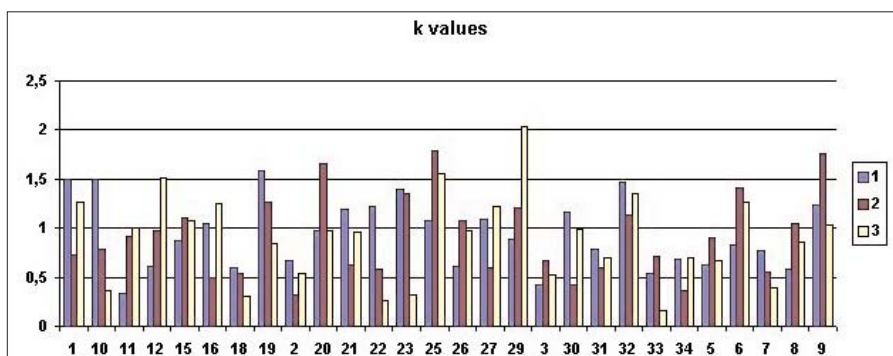
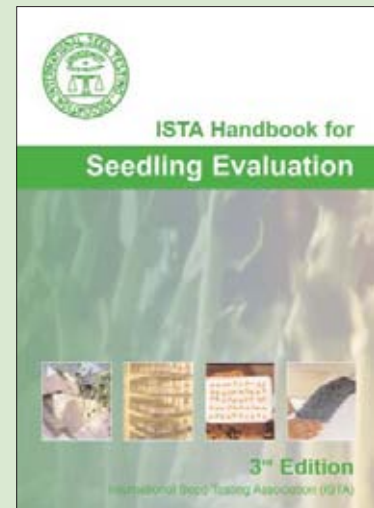


Figure 2. k values for 28 conductivity readings of three seed lots. k values indicate the degree of variability within each laboratory.

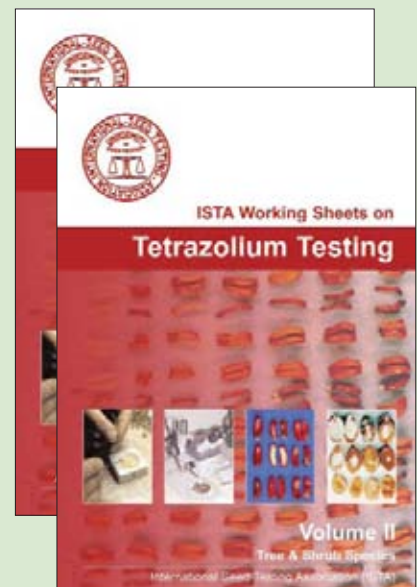
Newly Released ISTA Handbooks

Available directly from the
ISTA Secretariat or online at
www.seedtest.org



ISTA Handbook for Seedling Evaluation

3rd Edition, 2003
By Ronald Don



ISTA Working Sheets on Tetrazolium Testing

Volume I - Agricultural, Vegetable and
Horticultural Species
Volume II - Tree and Shrub Species
Edited by Norbert Leist and
Stephanie Krämer
Illustrated by Jochen Pfäfflin

Report on the ILAC/IAF 2003 General Assembly

Bratislava, Slovakia,
September 14 - 22, 2003

By **Martina Rösch**, Head of ISTA Accreditation



The suggested resolution to create a new membership category was rejected but the ILAC membership endorsed development of mechanisms for intensified cooperation with such organisations which might also change ISTA's involvement in ILAC.

ILAC (International Laboratory Accreditation Cooperation) and IAF (International Accreditation Forum) held their Joint Annual Meeting 2003 in Bratislava, Slovakia hosted by SNAS (Slovak National Accreditation Service). ISTA is a stakeholder member of ILAC and as such attended the LC (Laboratory Committee) Meeting, the first day of the 7th ILAC General Assembly and the joint ILAC/IAF General Assembly. The various committees of ILAC and IAF held their meetings before the General Assembly commenced.

The past year has seen the incorporation of ILAC on January 20, 2003. In support of this, the ILAC Articles and Bylaws were revised to implement them at the date of incorporation. The latest draft of the ILAC Strategic and Business Plan was presented to the membership during the annual meeting in order to give the possibility to raise questions and discuss the concept. The ILAC Strategic and Business Plan shall provide strategic directions and goals for ILAC over the next three years. This documents is aimed to be finalised in 2004.

ILAC endorsed the procedures for the regis-

tration and protection of the ILAC MRA Mark. This mark may be used by ILAC Signatories in combination with their own mark in order to indicate their signatory status. Laboratories accredited by an ILAC Full Member may use this combined mark under the conditions specified by the accreditation body.

During the ILAC General Assembly, also the question of new membership categories was being discussed quite controversially. There are various conformity assessment bodies like ISTA who assess technical competence of laboratories and inspection bodies to requirements which differ from the ILAC Arrangement. For the time being, under the current ILAC Rules, ISTA could not become Signatory to the ILAC Arrangement. The suggested resolution to create a new membership category was rejected but the ILAC membership endorsed development of mechanisms for intensified cooperation with such organisations which might also change ISTA's involvement in ILAC.

Over the last years, the stakeholder members of ILAC were given the opportunity to be more actively involved in the operation of ILAC. It is desired that the stakeholders play an active part in the work of ILAC committees and working groups. Stakeholders are now invited to attend and contribute to committee meetings rather than to have an observer status only.

Three new ILAC full members signed the ILAC Arrangement during the Signing Ceremony. To date, ILAC has 44 Full Members, so called Signatories to the Arrangement, representing 35 economies.

For more information on ILAC, please visit the ILAC website at www.ilac.org ■

Re-accredited ISTA Member Laboratories

Status - February 12, 2004

AR - Argentina

ARDL01

Laboratorio Centr. de Análisis
de Semillas, Instituto
Nacional de Semillas
Paseo Colón 922, 4° Piso
1063 Buenos Aires

Phone: +54114349 2035
Fax: +54114349 2417
E-mail: momore@sagpya.minproduccion.gov.ar

AT-Austria

ATDL03

Austrian Agency for Health and
Food Safety
Institute for Seed
Spargelfeldstrasse 191
P.O. Box 400
1226 Vienna

Phone: +43 1 732164159
Fax: +43 1732164174
E-mail: institut.saagut@lwvie.ages.at

ATML04

Pioneer Hi-Bred
Seed Quality Laboratory
7111 Parndorf

Phone: +43 2166 2525
Fax: +43 2166252562
E-mail: lotte.leonhardt@pioneer.com

BE - Belgium

BEDL02

Federaal Voedingslaboratorium
Monsieur M. Claes
Braemkasteelstraat 59
9050 Gentbrugge

Phone: +32 9 2316888
Fax: +32 9 2320582
E-mail: Kristine.Rooms@favv.be

CZ - Czech Republic

CZDL03

Central Institute for Super-
vising and Testing in Agric.
Department of Seed Testing
Za opravnou 4
150 06 Praha 5 - Motol

Phone: +420 2 57211751
Fax: +420 257211748
E-mail: odbor.os@oos.zeus.cz

DE - Germany**DEDL05**

HDLGN, LUFA Kassel
Am Versuchsfeld 11-13
34128 Kassel

Phone: +49 561 9888153
Fax: +49 5619888300
E-mail: anna-luise.v.lieres@lufa-kassel.de

DEDL07

Bayerische Landesanstalt für Landwirtschaft,
Institut für Pflanzenbau & Pflanzenzüchtung
Arbeitsber. Saatgutuntersuch.
Lange Point 6/II
85354 Freising

Phone: +49 8161 713953
Fax: +49 8161714407
E-mail: Berta.Killermann@lfl.bayern.de

DK - Denmark**DKDL01**

Danish Plant Directorate
Skovbrynet 20
2800 Kgs. Lyngby

Phone: +45 45 263600
Fax: +45 45 263617
E-mail: pdir@pdir.dk

GB - United Kingdom**GBDL01**

Official Seed Testing Station
for England and Wales
NIAB
Huntingdon Road
Cambridge CB3 0LE

Phone: +44 1223 276381
Fax: +44 1223277602
E-mail: steve.jones@niab.com

KE - Kenya**KEDL01**

National Seed Quality
Control Service
Seed Testing Laboratory
P.O. Box 1679
Nakuru

Phone: +254 051 850106
Fax: +254 051851268
E-mail: kephissq@nbnet.co.ke

NL - Netherlands**NLDL03**

Seed Testing Station
NAK
Randweg 14
P.O. Box 1115
8300 BC Emmeloord

Phone: +31 527 635400
Fax: +31 527 635411
E-mail: tstolte@nak.nl

NZ - New Zealand**NZDL02**

Centre for Plant Reproduction
& Seed Technology
Institute of Natural Resources
Massey University
P.B. 11 222
Palmerston North

Phone: +64 6 3505799
Fax: +64 6 3505649
E-mail: C.R.McGill@massey.ac.nz

NZML03

New Zealand Seedlab
60 Ryans Road
P.O. Box 16-101
Christchurch

Phone: +64 3 3428860
Fax: +64 3 3428820
E-mail: info@nzseedlab.co.nz

NZDL04

New Zealand Seed Technology
Institute
P.O. Box 84
Lincoln University, Canterbury

Phone: +64 3 3253872
Fax: +64 3 3253872
E-mail: hillm@lincoln.ac.nz

SE - Sweden**SEDL07**

Frökontrollen
Mellansverige AB
Section Örebro
P.O.Box 22014
702 02 Örebro

Phone: +46 19 6114607
Fax: +46 19 135082
E-mail: frokontrollen@hush.se

YU - Yugoslavia**YUDL01**

Jugoinspekt Beograd
(Zavod Topcider)
Seed Testing Laboratory
Teodora Drajzera 11
P.O. Box 790
11000 Beograd

Phone: +381 11 2668223
Fax: +381 112663551
E-mail: topcider@sezampro.yu

YUDL02

National Seed Testing
Laboratory
Maksima Gorkog 30
21000 Novi Sad

Phone: +381 21 421717
Fax: +381 21 621212
E-mail: mirjana@ifvcns.ns.ac.yu

YUDL03

Inst. za kukuruz Zemun Polje
Maize Research Institute
Seed Testing Laboratory
Slobodana Bajica 1
P.O.Box 89
11080 Beograd-Zemun

Phone: +381 11 3754989
Fax: +381 113754994
E-mail: divanovic@mrizp.co.yu

Newly Accredited ISTA Member Laboratories

Status - February 12, 2004

DK - Denmark**DKML07**

L. Dæhnfeldt A/S
Germination Laboratory
Breeding Station Danefeld
Odensevej 82
5290 Marslev

Phone: +45 63 17 5506
Fax: +45 63 17 5505
E-mail: daehnfeldt@daehnfeldt.com

JP - Japan**JPML05**

Sakata Seed Corporation
Seed Testing Department
1660, Hazawa-Cho, Kanagawa-ku
Yokohama, 221-0863

Phone: +81 45 383 1621
Fax: +81 45 3719366
E-mail: aki.suzuki@sakata-seed.co.jp

US - United States**USML06**

Mid-West Seed Services, Inc.
236 32nd Avenue
Brookings, SD 57006

Phone: +1 605 6927611
Fax: +1 605 6927617
E-mail: timg@mwseed.com

New ISTA Members and Membership Mutations

Status - 31 December 2003

New ISTA Members

MX- Mexico

MXDL01 / MXDM01

Colegio de Postgraduados Seed Testing
Laboratory,

Genetic Resources Institute

Km. 35.5 Carretera, Mexico Texcoco,

C.P. 56230 Montecillo

Phone: +52 55 58045963

Fax: +52 5558045962

E-mail: coordsem@colpos.colpos.mx

Personal member : Mr. José Manuel Chávez
Bravo

Mutations

BG - Bulgaria

BGDM01

New personal member : Mrs. Bistra

Pavlovska

Central Seed Testing Station,

125 Tzarigradsko Shosse Blvd., Block 1,

Sofia - 1113

Phone: +359 2 2700477

Fax: +359 2 708027

E-mail: iasas@spnet.net

(formerly Mrs. Mrs. Maria Chalashkanova)

DK- Denmark

DKPM02

New personal member : Mr. Jens Hellesøe

DLF-Trifolium A/S,

Stensøvej 1, 4900 Nakskov

Phone: +45 54 922511

Fax: +45 54 925222

E-mail: jhe@dlf.dk

(formerly Mrs. Lisbeth Jensen)

ES - Spain

ESDM01

New personal member : Mr. Ricardo Lopez
de Haro Wood

Ministerio de Agricultura Pesca y

Alimentacion, Direccion General de Agri.,

O.E.V.V, Avda. de Barcelona 6,

28007 Madrid



Phone: +34 91 3476593

Fax: +34 91 3476703

E-mail: lopezdeharo@mapya.es

(formerly Mr. Martin Fernández de

Gorostiza)

JP- Japan

JPDM01

New personal member : Mr. Sanji Takemori

Seeds and Seedlings Division,

Agricultural Production Bureau, MAFF

1-2-1 Kasumigaseki, Chiyoda-ku,

Tokyo 100-8950

Phone: +81 3 3591 0524

Fax: +81 3 35025301 E-mail: sanji_takemo-

ri@nm.maff.go.jp

(formerly Mr. Toyoharu Fukuda)

JPDM02

New personal member : Mr. Kazutoshi

Okuno

National Institute of Agrobiological

Resources-NIAS

Kannondai 2-1-2, Tsukuba,

Ibaraki 305-8602

Phone: +81 298 387013

Fax: +81 298 387408

(formerly Mr. Shoji Miyazaki)

JPDM03

New personal member : Mr. Tadashi Shiota

Livestock Production and Feed Division,

Agri. Production Bureau, MAFF

1-2-1 Kasumigaseki, Chiyoda-ku,

Tokyo 100-8950

Phone: +81 3 3502 8111

Fax: +81 3 35800078

(formerly Mr. Motoji Kimura)

UPOV Press Release - October 2003

Dr. Kamil Idris re-appointed UPOV Secretary-General

The Council of the International Union for the Protection of New Varieties of Plants (UPOV) re-appointed Dr. Kamil Idris, a Sudanese national, as Secretary-General of UPOV, on Thursday, October 23, 2003. Dr. Idris begins a second six-year mandate for the period December 1, 2003, to November 30, 2009. His re-appointment is related to an agreement between UPOV and the World Intellectual Property Organization (WIPO) that stipulates that the head of WIPO is also the head of UPOV.

"UPOV is a well-balanced system that encourages the development of new varieties of plants for the benefit of society. New varieties of plants are one of the most effective tools to promote sustainable agriculture, food production and overall economic development," said Dr. Idris. He added "The protection of new plant varieties is essential in encouraging breeders to pursue and enhance their search for improved varieties with higher yield, better resistance to pests and diseases, drought and other adverse conditions."

The Council of UPOV expressed its appreciation that Dr. Idris did not wish to receive an indemnity from UPOV, and noted his decision that this saving should be used for financing activities for developing countries.

UPOV is an independent intergovernmental organization of 53 members, based in Geneva.

For further information about UPOV,
please contact its Secretariat:

Phone: (+41-22) 3389155

Fax: (+41-22) 733 0336

E-mail: upov.mail@wipo.int

Website: www.upov.int

Danish Government Institute of Seed Pathology for Developing Countries - Press Release

Dr. S.B. Mathur's Retirement

This is to inform you that our Director Dr. S.B. Mathur has decided to retire by the end of December 2003. In reaching the honourable age of 69, Dr. Mathur has

Continued on page 56

Welcome!

International Seed Testing Association

- develops, adopts and publishes standard procedures for sampling and testing seeds
- promotes uniform application of these procedures for evaluation of seeds moving in international trade
- promotes research in all areas of seed science and technology
- Accredits Member Laboratories
- to participate in conferences and training courses
- has established & maintains liaison with other organisations having common or related interests in seed

ISTA Membership offers you

- ✓ free access to the 'International Rules for Seed Testing', an internationally standardised publication containing seed testing procedures and techniques, which is constantly revised and updated
- ✓ valuable information through all ISTA publications, including Seed Science Technology and Technical Handbooks, which are free for members
- ✓ involvement in seed testing methodology development
- ✓ ISTA proficiency testing, quality assurance standards and auditing services, which assist you in attaining the highest quality assurance levels in today's business environment
- ✓ the possibility of issuing ISTA international certificates
- ✓ easy access to leading seed experts worldwide

"ISTA, providing methods & services
for the testing of seed moving
in international trade..."

ISTA



International Seed Testing Association
Association Internationale d'Essais de Semences
Internationale Vereinigung für Saatgutprüfung

REQUEST FORM

All interested persons are invited to forward the attached request form to the ISTA Secretariat, PO Box 308, 8303 Bassersdorf, CH-Switzerland, phone +41 1 838 6000 or fax +41 1 838 6001, E-mail ista.office@ista.ch to receive a membership information package.



Yes, please send me more information on how to become an ISTA Member.

Contact Person _____

Organisation _____

Address _____

City _____

Postal Code _____

Country _____

Phone _____

Fax _____

Email _____

Dec 2003



ISF Press Release

World Seed Congress 2004

The annual ISF Congress will take place in Berlin, Germany on 24 - 26 May 2004. Germany last hosted the second joint FIS/ASSINSEL congress 26 years ago in 1978.

Berlin expects to see a record number of delegates from over 70 countries. As the largest international gathering for seedsmen and seedswomen the world over, the congress provides a:

- forum for discussion on topics ranging from crop specific issues to trade and arbitration to intellectual property and plant breeding
- meeting place for colleagues to exchange scientific, technical and commercial information
- floor for trading seed and planting material, and exhibition booths

With the European Union poised to expand eastwards, the Berlin congress also expects to offer a gateway to the accession and other east European countries to global markets. Delegates and accompanying persons can experience the historic splendours of Potsdam, Sanssouci Palace and the Berlin Cathedral, among many others.

The ISF Breeders Committee will organise an international seminar on Intellectual Property and Access to Plant Genetic Resources after the congress on 27 and 28 May 2004.

The full information package on the congress will be available on-line in January at www.worldseed2004.com

Main items on the agenda

- Essential derivation: codes of conduct for several crops and possible arbitration procedures in case of disputes
- Organic Agriculture: use of organic seed, co-existence of organic and other forms of agriculture
- Sustainable Agriculture, renewable energy and raw materials
- Presentation of the German seed industry
- Traceability and Identity Preservation
- Plant/pest relationship: recommended terminology to be used by ISF members



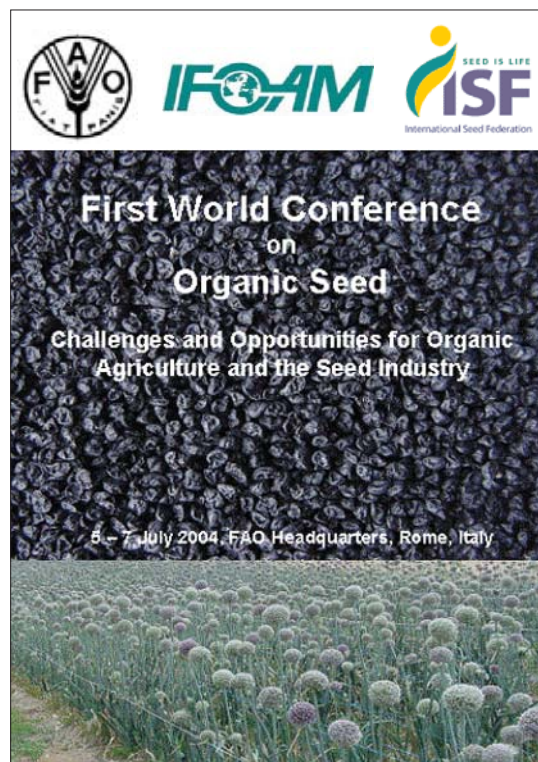
For more information, contact the ISF Secretariat:

Chemin du Reposoir 7, 1260 Nyon, Switzerland
 Tel: +41 22 365 44 20, Fax: +41 22 365 44 21
 E-mail: isf@worldseed.org, Web: www.worldseed.org

First World Conference on Organic Seed

Challenges and Opportunities for Organic Agriculture and the Seed Industry

FAO Headquarters, Rome, Italy
July 5 - 7, 2004



Conference Goals

- Create a platform for international information and knowledge exchange between the organic movement and the "conventional" seed sector
- Focus on scientific/technical aspects related to organic seed issues
- Evaluate regulatory requirements and related issues for organic seed
- Provide a platform for networking and cooperation

Who should attend

This international conference is intended for all the relevant stakeholders of the organic seed sector. Anticipated delegates should be scientists/plant breeders, seed producers, farmers, certifiers, governments and other stakeholders interested in organic farming and seed production.

About the Organisers

The Food and Agriculture Organisation (FAO) was founded in 1945 with a mandate to raise levels of nutrition and standards of living, to improve agricultural productivity, and to better the conditions of rural populations.

The International Federation of Organic Agriculture Movements (IFOAM) is the worldwide umbrella organisation for the

organic movement. Its goal is the worldwide adoption of ecologically, socially and economically sound systems that are based on the principles of Organic Agriculture.

The International Seed Federation (ISF) is a non-profit organisation representing the main stream of the world seed trade and plant breeders community, and serves as an international forum where issues of interest to the world seed industry are discussed.

Preliminary Programme

Sunday, 4 July 2004
Registration and Reception

Monday, 5 July 2004
Challenges of Organic Seed Production
The opening plenary session will feature presentations from prominent speakers on the technical and socio-economic challenges faced in organic seed production.

In 4 parallel sessions, the afternoon sitting will deal with technical issues facing the production of organic seed for cereal, vegetable, potato and forage crops.

Tuesday, 6 July 2004
Seed Quality (Morning Session)
In 4 parallel sessions, germination and purity standards, thresholds for seed-borne diseases, seed pelleting and priming, and approved seed treatments, among others, will be discussed.

Regulatory Issues in Organic Agriculture (Afternoon Session)

This plenary session will focus on similarities and differences in regulations between major trading partners, and the need for and steps towards their harmonization for organic seed production.

Wednesday, 7 July 2004

Maintenance of Biodiversity (Morning Session only)

Presentations on a wide range of subjects such as the needs of the organic sector for biodiversity as it pertains to organic seed availability, comparison of open-pollinated versus hybrid seed for breeding and organic seed production, and important variety characteristics for organic seed producers are planned.

Partner Organisations



EUCARPIA



ISTA Participates at the Asian Seed Congress

Bangkok, Thailand, November 17 - 21, 2003

Another highly successful Asian Seed Congress was held in Bangkok, Thailand, November 17 - 21, 2003. ISTA was represented with an exhibition stand, where information documents were offered to the Asian Seed Congress delegates, and where the latest publications such as 'The International Rules for Seed Testing', 'ISTA Working Sheets on Tetrazolium Testing' and 'ISTA Handbook on Seedling Evaluation' were displayed.

The response from the delegates towards ISTA was good, and much interest was shown in the Association. Many orders were placed for the new publications. New contacts were made, and existing contacts were strengthened. For ISTA it was a successful event.

With over 500 delegates, the excellent facilities of the Imperial Queen's Park Hotel, the trading room continuously bustling with business opportunities, the interesting display at the exhibition booth area - all contributed to the overall success of the congress.

The Chief Guest of Honor, Deputy Permanent Secretary of Agriculture and Cooperatives, Mr. Wowate Tamronglak, officially welcomed all the delegates to the Asian Seed Congress 2003.

Technical Sessions

Two country reports and four technical papers were presented. Dr. Chairerg Sagwansupyakorn talked on the development of seed trade in Thailand and China's vegetable seed industry was presented by Dr. Sun Rifei. Dr. Clive James presentation was on the global status of GM crops in Asia and Pacific region followed with Dr. Syed Wajid Pirzada's paper on SPS measures under WTO regime. The relation between PVP and patents on biotechnology was presented by Mr. Bart Kiewiet which was followed by international exchange of plant genetic resource for food and agriculture by Mrs. Andree Sontot.

Special Interest Groups

The SIG on Tropical Forage and Pasture meeting highlighted the urgent need for better information in individual forage and amenity products and for more rigorous and detailed trials to determine their adaptation and use. The Vegetable Group focused on APSA collaborative research projects, particularly that with AVRDC. A recommendation was made to take up issues such as standardization of the codes for resistance/tolerance, discussion on seed health in the region, and various crops and their diseases. The Hybrid Rice SIG held a lively discussion which saw participants



sharing information about the technology and trade-related activities in their respective countries.

Organising more trainings for APSA members was recommended. Participants were also encouraged to attend four ISTA Seed Testing Training Programs to be arranged by APSA in 2004.

The formal Grand Banquet was held on the third night of the Congress, attended by Thai Permanent Secretary of Agriculture and Cooperatives, Banphot Hongthong. A grand cultural show of Thai music and dance was presented while delegates enjoy a sumptuous dinner. The turn-over of the Asian Seed Congress flag to the next host was among the highlights of the evening for Korea. ■

Continued from page 52

taken this decision; he would like to enjoy his otium and devote his retirement time to his children and grandchildren.

Some of you may know that the Institute of Seed Pathology is his brainchild. In 1966 he and Dr. Paul Neergaard created the institute in Hellerup, situated in the outskirts of Copenhagen, that you have probably visited. In a villa house, facilities were established in a few hundred square meters where scientists and seed analysts from all over the world found a home, and where they much enjoyed learning seed pathology for better food production in their home countries.

As an associate to Dr. Mathur for the past 17 years, I have been aware of his tremendous capacity in the field of seed pathology

and in teaching and research which has been considered a great contribution to the agriculture development in lesser privileged countries of the third world. His work that have been recognised and acknowledged by awards, e.g. The World Seed Prize by FIS, Switzerland.

Under his dynamic leadership, the Institute has established itself as a unique leading international institute in the field of seed pathology. The institute will strive to keep up the Seed Pathology flag in its new structure under the Royal Veterinary and Agricultural University of Denmark, which we became affiliated to in 1991.

Dr. Mathur's vision to create two Seed Pathology Centres, one in Africa and the other in Asia, along with the continuation of our Capacity Enhancement Projects

(CEPs) on the two continents have already taken shape with a view to a greater multiplying effect in the developing world.

Apart from being with the family, Dr. Mathur will certainly find time to guide others wherever needed in the future. It is his wish still to devote some of his time, not only to academic activities, but also to poor farmers of the developing world.

Dr. CN Mortensen, Deputy Director

Contact Details:

Phone: (+45) 35 28 3727

Fax: (+45) 35 283701

E-mail: seedpath@kvl.dk

Website: www.dgisp.kvl.dk

CALENDAR

2004

May

- 6-11 **ISTA Seed Health Committee Workshop**
(Novi Sad, Serbia and Montenegro)
- 11-12 **Pre-Congress ISTA Purity Workshop**
(Budapest, Hungary)
- 13-24 **ISTA 27th International Seed Testing Congress**
(Budapest, Hungary)
- 24-26 **ISF Congress**
(Berlin, Germany)

June

- 15-16 **ISTA Tetrazolium Committee Workshop**
(Brookings, United States)

July

- 5-7 **First World Conference on Organic Seed**
(Rome, Italy)
- 10-14 **4th ISTA/FAO Workshop on GMO Detection**
(Ljubljana, Slovenia)

2005

May

- 10-13 **5th ISTA - SHC Seed Health Symposium**
(Angers, France)



International Seed Testing Association (ISTA)

ISTA Secretariat, Zürichstrasse 50, PO Box 308, 8303 Bassersdorf, CH - Switzerland
Phone: +41 1 838 6000, Fax: +41 1 838 6001, E-mail: ista.office@ista.ch

www.seedtest.org