



international society
for seed science

issss newsletter

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iss activities

In the second half of 2003 the Society supported three meetings: the 23rd Seed Biology and Ecology meeting in Cambridge, UK; the Desiccation Workshop in South Africa; and the Seed Quality Workshop in Poland. Reports on the last two are given elsewhere in the Newsletter. The financial support provided by the Society went towards assisting speakers or younger members of ISSS who attended. In 2004, the Society is holding one meeting and is sponsoring or collaborating in three others. Details are given below. It is worth reminding you that **ISSS might also support your local meeting provided it meets certain of the Society's requirements**. So if you are planning to run a seed meeting, contact the ISSS Secretary and the Treasurer to see if it qualifies.

Information about the ISSS 8th International Workshop on Seed Biology in May 2005 in Brisbane will be made known as it becomes available.

Another reminder: if you have any suggestions regarding meetings or other activities of the ISSS please be sure to make them known to your officers.

officers

Just in case you have lost previous information you are reminded that your officers are:

President, Ralph Obendorf (rlo1@cornell.edu)

President-Elect, Derek Bewley (dbewley@uoquelph.ca)

Secretary, Kent Bradford (kjbradford@ucdavis.edu)

Treasurer, Ken Thompson (ken.thompson@sheffield.ac.uk)

Contact them if you have any queries or suggestions.

Note that Kent Bradford's term as Secretary ends this year and a call for nominations will soon be made. Information can be obtained from Kent about the work of the Secretary so anyone who is interested, either for her/himself or to nominate another, can contact him for details.

news from around the world

Paris, France

Daniel Côme and Françoise Corbineau report that due to the renovation of the Jussieu Campus, the Laboratoire de Physiologie Végétale Appliquée will move in March 2004, for 3-4 years, to Ivry-sur-Seine, close to Paris. However, their address (Université Pierre et Marie Curie, Laboratoire de Physiologie Végétale Appliquée, Tour 53, 1^{er} étage, 4 place Jussieu, 75252 Paris cedex 05, France), telephone (+33 (0)1 44 27 59 26/87), fax (+33 (0)1 44 27 59 27), and e-mail (come@ccr.jussieu.fr, corbi@ccr.jussieu.fr) will remain unchanged. The laboratory has now a web site (in French): <http://lpva.snv.jussieu.fr>.

Bari, Italy

Antonio Dell'Aquila's new web site entitled *Seed Germination & Computer Imaging* is available at <http://germimaging.ba.cnr.it>. These pages are the result of a research program on the application of new imaging techniques to study seed germination. The research began in 1998 with the research group of image analysis at Plant Research International (Wageningen, The Netherlands) by *The Program of Short Mobility for Scientists*, funded from the Italian CNR, and continues with the application of a computer-aided image analysis system to study seed imbibition in several species

under different environmental conditions. An animation can be downloaded and used for educational purposes, while the time courses of image analysis parameters show the potential of the new technique to describe the imbibition process.

Edmonton, Canada

Professor David J. Gifford. We report with sadness the sudden death of David Gifford on August 15, 2003, just short of his 59th birthday. David joined the University of Alberta, Edmonton in 1986 and became a full Professor in 1997. He was known for his work on gymnosperm seeds, including reserve mobilization, and for his studies on somatic and zygotic pine embryos. He received the Tree Physiology Award for outstanding research from the Canadian Society of Plant Physiologists, a society in which he was very active. David was also an enthusiastic supporter of the ISSS: he and several of his students attended the 2002 meeting in Spain, where David's paper was a highlight. He had many friends within our organization. He served for 15 years on the *Canadian Journal of Botany*, becoming Associate Editor with responsibility for many of the submissions in seed science. David was also a founding executive member of Plant Canada, a new umbrella organization linking all of the botanical societies in Canada and was to be a principal organizer of the first full Plant Canada meeting in 2005 at the University of Alberta. His enthusiasm and wise counsel will be sorely missed by the plant science community in Canada and by seed scientists internationally. An obituary was published in the August, 2003 issue of the *Canadian Journal of Botany* (vol. 81).

If any member of the ISSS would like to make a donation in memory of David, a fund has been established in his name at the University of Alberta. Cheques should be made payable to "The University of Alberta" and marked "in memory of Dr. David J. Gifford." For further information please contact: Development Office, 6th floor, General Services Building, University of Alberta, Edmonton, AB T6G 2H1, Canada. Phone: (780) 492 4418 [Toll free outside of Edmonton: 1-888-799-9899].

Western Ontario, Canada

Dr. David Susko has left the University of Western Ontario to take up a faculty position at the University of Michigan at Dearborn. He will be continuing his research in seed ecology there.

Poznań, Poland

The 2nd International Seed Health Conference "HEALTHY SEED FOR HEALTHY CROP" was organised by the Polish Phytopathological Society and the Poznań Agricultural University on 16-18 September 2003 in Poznań. Sixty-four participants representing agricultural universities, research institutes, plant protection and seed inspection services, chemical and seed companies, seed technology groups, and state forest units from 9 countries attended the conference. Oral (19) and poster presentations (25) focused on the following main topics: seed-pathogen-environment relationships; quarantine and certification as a tool to minimise distribution of seedborne pathogens; methods for detection of seedborne pathogens; toxigenicity of seedborne fungi; seed treatments; pathological aspects of seed storage; tree seed pathology. A visit to the Institute of Dendrology, Polish Academy of Sciences, allowed the participants to see the research on tree seed science and technology carried out there. The next conference will be held in Bydgoszcz/Toruń in 2006.

Kew Gardens, UK

Release 5 of Kew's Seed Information Database - SID- is now live on their internet site at <http://www.rbgekew.org.uk/data/sid/>. A number of changes and improvements have been made in this release, most notably:

- A new module containing seed protein contents for ca 2400 species has been added.
- The seed weight dataset has been expanded to include an extra 590 entries.
- The seed storage behaviour dataset has been expanded to include data for an additional 260 species, and a number of existing entries have been updated to take into account new research observations.
- The dispersal dataset has been expanded to include data for an additional 730 species.

- The germination dataset has been expanded to include data for an additional 285 species.
- The seed oil content dataset has been expanded to include an extra 50 entries.

For further information, questions and feedback, contact sid@rbgkew.org.uk.

● seeds in the news

Farm Scale Evaluations reported in the UK. The controversy relating to GM crops continues in various parts of the world, with seeds again much to the fore. In the UK the results of the farm-scale evaluations have just been published in a series of eight papers in the Philosophical Transactions of the Royal Society (November 2003 Vol. 358, No. 1439)). One finding from the study is that the biodiversity (numbers and variety of insects and other invertebrates) was reduced in fields planted with GM (herbicide-resistant) rapeseed (canola) and sugar beet, but not in maize fields, due to lower weed populations in the former. It was predicted, but not documented, that the lower availability of weed seeds due to better weed control in canola and sugar beet might reduce bird populations. The result was hardly surprising, since the crops were treated with effective weed-killing herbicides, and limiting seed production by weeds is a primary objective of integrated weed control programs. But aggressive negative reporting of the results created a public impression that it is the GM plants that are to blame and not the agricultural management practice of using herbicides. This is regrettable because GM technology has been condemned quite regardless of whether or not it has potential benefits which may not necessarily generate biodiversity problems. The President of The Royal Society (the UK national academy of sciences), Lord May, has rightly pointed out that we need a debate on modern farming practices, not an attack on GM. A rebuttal to the interpretation put on the results by anti-GM commentators can be found at Nature Biotechnology 21 (12) 1429-30.

Seed toxins. In the last newsletter we featured, in relation to alleged potential terrorist activities in Britain, a seed that yields a powerful toxin, *Ricinus communis*. Recently, another poisonous seed came into the news. In 2001 a torso (i.e., a headless, limbless body) of a young boy was found floating in the river Thames in London. Painstaking forensic work over the next year revealed that he came from a coastal strip of Nigeria in West Africa. Included in the boy's stomach contents was some vegetable matter which remained unidentified until just a few weeks ago when, thanks to a plant anatomist at the Royal Botanical Gardens, Kew, it was found to be the remains of calabar bean tissues. The calabar bean (*Physostigma venenosum*) is a native of tropical Africa where, in the Calabar region, it may be known as the Esere or ordeal bean for reasons which will soon be apparent. The climbing plant produces pods about 15 cm long, each containing 2-3 seeds about 2 cm in length. The bean is used in several ritual practices in West Africa, particularly in trials for witchcraft and various crimes, where the accused has to eat it. If death follows, it is taken to indicate guilt, but if the accused succeeds in vomiting out the seed concoction within about 30 min, he or she is considered innocent. The police view now is that the boy was used in some kind of ritual which eventually resulted in his death, possibly by calabar bean poisoning. About 1% of the weight of the bean is comprised of the alkaloids calabarine and physostigmine (also known as eserine), the latter having great pharmacological activity. Unstriated muscle in the arterioles and elsewhere is affected, causing an enormous rise in blood pressure. Effects also occur on the vagus nerve, leading to heart failure. But physostigmine also has several clinical uses and is especially valuable in ophthalmology to contract the iris, among other things. Its effect on the eye muscles were first described in the mid-1860s by a Dr Argyll Robertson in Edinburgh, who applied an extract of the bean to his own eye: I have not been able to discover why he chose to do this!

● did you know?

In the English language seeds are commonly invoked metaphorically to imply the beginning, start or implantation. Expressions such as 'seeds of change', 'seeds of doubt', 'seeds of hate', 'seeds of hope' and many more occur frequently in spoken and written English. And sometimes seeds are used to suggest not the start but the end, which may be undesirable: recall 'going to seed', or, as Shakespeare put it, " 'tis an unweeded garden that grows to seed: things rank and gross in nature...." Seeds can also indicate the best, hence the 'seeded' players in Wimbledon tennis and other

tournaments. The allusion here is to the best seeds, yielding plants that are not weeded out. But back to Shakespeare: In his play, *Henry IV*, Falstaff and friends plan to carry out a robbery and in an attempt to persuade another villain to join them they assure him that they will not be seen because “we have the receipt of fern seed, we walk invisible.” Good botanists nowadays know that ferns do not produce seeds, so what did Shakespeare mean? In his time, it was widely thought that ferns must have seeds, for how else could they reproduce? Indeed, the French botanist de Tournefort wrote in 1694, “The views of those who believe that all plants have seeds are founded on very reasonable conjecture.” What was special about fern seeds, it was reasoned, was that they were invisible, and moreover, anyone who held a fern seed himself became invisible – one could “walk invisible.” But how does one collect fern seeds? The trick is to stack twelve pewter plates underneath the leaf of a fern on Midsummer Night. The dispersed seed passes through eleven plates but is stopped by the twelfth. Now there’s an idea for a grant application. Try it!

● seed puzzler

In the last newsletter your editor commented that some properties of seeds are taken for granted by seed scientists though there is no explanation for them. To give you the opportunity to speculate, your editor proposed raising certain puzzles in each issue of the newsletter. The last poser, “How do seeds of different species have vastly different germination rates – and is this worth knowing?” elicited no response whatsoever. I have a suspicion that it was too simple and that you were all offended by such a naïve question. But let’s persist: you can still offer your ideas on germination rate and here’s another to think about. “How do seeds fix the different proportions of their storage reserves so precisely? It is obviously under genetic control, so is there a gene for, e.g. 40% protein, 50% oil....or what?” Send in your ideas. No prizes will be awarded.

● books

Nicolás, G., Bradford, K.J., Come, D. and Pritchard, H. (eds) (2003) *The Biology of Seeds: Recent Research Advances*. CABI Publishing, Wallingford, UK. This book contains presentations from the ISSS Salamanca meeting, May 2002. This has now been published and those who attended the meeting should have received their copy by now. If not, contact CABI. ISSS members who did not attend the meeting can purchase the book at a 25% discount (see below).

CABI publications All ISSS members receive a 25% discount on books on seeds published by CABI. Currently on the ISSS website there is a pdf listing all books available (referred to as the 'ISSS Book Titles' on the website), another separate pdf of the order form (referred to as 'ISSS Book Order Form' on the website) and an ISSS Price list 2004.pdf. Remember that ISSS members can subscribe to *Seed Science Research* at a substantial discount.

● isss meetings reports

New Developments in Seed Quality Improvements. 23-25 October 2003, University of Lodz, Poland.

The conference *New Developments in Seed Quality Improvements* was the fifth meeting in the framework of International Workshops on Applied Seed Biology held to encourage cooperation among researchers, students, plant breeders and seed technologists working in the field of seed quality improvement in western, central and eastern Europe. This series of conferences was initiated in 1977 by Prof. Daniel Côme from Université Pierre et Marie Curie (Paris) and Prof. Stanisław Lewak from Warsaw University. In the fifth Workshop, 83 participants were registered, representing 45 teams from 13 countries from Europe, Asia, America and Africa, working in seed research, technology and policy. ISSS was represented by 16 members, including four on the scientific committee.

This meeting, organized by Prof. Mieczysław Grzesik, Research Institute of Pomology and Floriculture, Skierniewice, Poland, with the help of Université Paris VI and TNO Leiden, was a forum for scientific discussion and a platform for active personal contacts among researchers and

technologists. During the conference, 26 lectures and 25 posters were presented in 5 sessions: Seed industry in integrated Europe, Seed storage, Seed development, germination and dormancy, Seed treatment technology, and Markers of seed quality. Two poster awards were presented by Germain's Technology Group, one to J. Sadowski from the University of Technology and Agriculture, Bydgoszcz, and the other to K. Posmyk from the University of Lodz, Poland. The Programme and Abstracts, in English and Polish, are published in PROGRAMME, BOOK OF ABSTRACTS, Lodz, Poland, 23-25 October 2003 (ISBN 83-8870773-6, 115 pages), in which the sponsors and the Index of Authors and Participants are also mentioned.

The exchange of ideas and free discussion between experts developed an understanding of the situation of seed production in the integrated Europe, broadened an appreciation of the problems concerning seed quality, and accelerated the introduction of new technologies. Because of the great interest of participants, it was decided that these meetings will be organized as a regular event every two years, together with ISSS and ESA, with the next one being in 2004 in Denmark. Information can be obtained from Prof. Mieczysław Grzesik (mgrzesik@insad.pl).

Fourth International Workshop, Desiccation Tolerance of Seeds and Vegetative Plant Tissues. August 2003, Blouwaterbaai, South Africa.

The Fourth Desiccation Workshop, as the meetings have come to be known, took place during the last week in August. These meetings, now officially sponsored by the ISSS, have all been organised by Patricia Berjak and Norman Pammenter (University of Natal, Durban), responsible for the seed side of things, with Jill Farrant (University of Cape Town) coordinating contributions on vegetative plant tissues. As before, the organising committee was ably assisted by a small team of post-graduate students, Sershen Naidoo, Prinisha Badassy and Gundula von Fintel, who put in the sterling effort required for the smooth progress of both the pre-meeting arrangements and the everyday operations at the Workshop. Remarkably, in our experience of many meetings, presentations via data projection went completely without a hitch - largely thanks to Prinisha's expertise. Support by the ISSS afforded assistance to four young people, hailing respectively from India, China, Nigeria and Russia.

The meeting afforded an exciting exploration of the latest progress contributing to our understanding of phenomena conferring desiccation tolerance and the factors underlying desiccation sensitivity, in combination with relaxed social interaction at a conference resort. Delegates from a wide variety of countries presented their contributions on general biology and ecology, desiccation damage, developmental aspects of desiccation tolerance, and mechanisms conferring desiccation tolerance, with applied aspects attracting many presentations. The theme, "Current concepts of mechanisms conferring desiccation tolerance" had a distinctly new flavour in the contribution of several papers based on molecular aspects underlying this phenomenon.

The choice of venue and timing of the 4th Desiccation Workshop had been chosen to coincide with the blooming of the arid-zone flora of the Northwestern Cape Province. However, we were let down by circumstances beyond our control: the area has a Mediterranean climate and the riot of flowers for which it is famous depends on good winter rainfall, which just did not occur this year. So the cool climate (a delegate was conspicuous by swaddling herself in a blanket - Africa-style) of early spring was braved in vain - except for the 'flower-show' in the gardens of Blouwaterbaai, where the beds had been irrigated in winter.

Besides the success of this Workshop, perhaps the most gratifying thing for the organisers was the unanimous vote that subsequent meetings in the series should remain based in South Africa, but return to the summertime. The 5th Desiccation Workshop is thus scheduled for early January, 2006, at a venue to be announced later.

The "DesWork Website", which records the happenings and many photos from the 4th meeting, will remain live, and notices about the next Workshop will appear there and will be advertised through the Biology List-Server and the ISSS Newsletter. The address is: <http://www.sles.und.ac.za/deswork>.

iss upcoming meetings

SEED ECOLOGY 2004 - an International Meeting on Seeds and the Environment. 29 April – 4 May 2004, Rhodes Island, Greece.

Costas Thanos and Ken Thompson write: We are happy to distribute the second e-circular of SEED ECOLOGY 2004 - an International Meeting on Seeds and the Environment. It is more than half a year (last February) since we announced the meeting. In the meantime we have received a very enthusiastic response with almost 200 preregistration forms while our e-mailing list has grown to over 600 entries. With the valuable help of the International Organising Committee, we have outlined the scientific programme and have appointed our eminent keynote speakers.

Today, we cordially invite you to join Seed Ecology 2004 and we ask you to prepare and submit your contributions. All necessary information can be found in our updated web site:

(<http://www.biology.uoa.gr/SeedEcology2004.htm>). From the homepage you can download: Abstract submission instructions, the Registration Form and the Accommodation Form. You can also find useful information regarding the aims, the organisers, the sponsors and the venue of the meeting.

Important Deadlines:

1. Deadline for receipt of Abstracts: January 10, 2004 (the authors will be notified about acceptance of contribution and its presentation type - oral/poster - by January 25, 2004).
2. Deadline for receipt of early Registration Form and Fees (late fees + 50 Euros thereafter): February 1, 2004.
3. Deadline for receipt of Accommodation Form (directly with the hotel): March 25, 2004.

We have decided to publish only a Book of Abstracts and we encourage everyone to submit their conference contributions to *Seed Science Research* or other prestigious scientific journals. Please bear in mind that we can allow (but not guarantee) a maximum of ONE oral contribution per registered participant. Also, talks and posters will only appear in the final programme (to be compiled by late February or early March) provided a valid registration form has been received from the speaker. The British Ecological Society have kindly agreed to include Seed Ecology 2004 in their Student Support Scheme which means that a sum of money has been allocated to provide a limited number of students with 50% of the costs of registration, meals and accommodation (see Sponsors section in the webpage).

We look forward to a stimulating SEED ECOLOGY 2004 conference that will showcase the latest and most exciting developments in all our relevant disciplines. We hope to hear from you soon and welcome you in Rhodes next spring

For all questions or additional information please contact one of us.

Costas Thanos (cthanos@biol.uoa.gr) - Ken Thompson (Ken.Thompson@sheffield.ac.uk)

Workshop on Molecular Aspects of Germination and Dormancy. 23-24 May 2004, Wageningen University, The Netherlands.

A two-day Workshop on this rapidly evolving topic will include speakers who are leaders in molecular research into germination and dormancy. The programme is detailed below. The intention is for this Workshop to be interactive, with new and exciting ideas and collaborations resulting from the discussions. To facilitate discussion, time is set aside after each invited speaker for participants in the Workshop to make a 5-minute presentation of their latest and emerging data, relevant to the topic, using a maximum of two overhead slides. There will be no posters. **This Workshop immediately precedes the Third Dormancy Symposium (May 25th-28th) also held at Wageningen University (see below).** Registration may be for either event or both, with a discount for the latter.

Workshop organizer: J. Derek Bewley (dbewley@uoguelph.ca). On-site organizer: Henk W.M. Hilhorst (congres.dorm2004@pph.dpw.wau.nl). Details on registration and accommodation, etc. are to be found at www.seedcentre.nl.

Confirmed Speakers:

Day 1. May 23rd. Germination.

08:30 Opening remarks

08:45-09:15 Henk Hilhorst. The Netherlands. Germination and dormancy, a perspective for molecular studies.

09:30-10:15 Mike Holdsworth. UK. Regulatory processes involved in the transition from embryo development to germination.

10:15-10:45 Discussion

11:15-12:00 Paolo Costantino. Italy. Transcriptional regulators involved in germination.

12:00-12:30 Discussion

14:00-14:45 Estela Sánchez de Jiménez. Mexico. Mechanisms that regulate protein synthesis during germination.

14:45-15:15 Discussion

15:15-16:00 Jorge Vasquez-Ramos. Mexico. DNA replication and the cell cycle during germination.

16:00-16:30 Discussion

16:45-17:30 Kent Bradford. USA. Enzymes associated with germination and emergence.

17:30-18:00 Discussion

Day 2. May 24th. Dormancy

08:30-09:15 Maarten Koornneef and Leonie Bentsink. The Netherlands. Genetic analysis of dormancy.

09:15-09:45 Discussion

09:45-10:30 Mike Foley. USA. Identification of genes that regulate dormancy in wild oat.

10:30-11:00 Discussion

11:30-12:15 Jinrong Peng. Singapore. GA-regulated genes associated with seed dormancy

12:15-12:45 Discussion

14:00-14:45 Eiji Nambara. Japan. ABA-mediated seed dormancy in Arabidopsis.

14:45-15:15 Discussion

15:45-16:30 Dominique Job. France. Prospects for understanding dormancy and germination using proteomics and genomics.

16:30-17:00 Discussion and closing session

Third International Symposium on Plant Dormancy. 25-28 May 2004, Wageningen University, The Netherlands. This Symposium, the third in a series following those in Corvallis, Oregon, in 1995 and in Angers, France, in 1999, immediately follows the Workshop on Molecular Aspects of Germination and Dormancy (see above). Details of the programme, venue, accommodation and registration for the Workshop and Symposium are on the web site of the Wageningen Seed Centre (www.seedcentre.nl). Registration for both the Workshop and the Symposium is discounted, and registration prior to 1 February 2004 also receives a discount. Contact Henk W.M. Hilhorst (congres.dorm2004@pph.dpw.wau.nl) for more information.

8th International Workshop on Seeds. May 2005, Brisbane, Australia.

Plans are proceeding for the Workshop and will be forwarded when available. Contact Steve Adkins (s.adkins@mailbox.uq.edu.au) for more information.

other meetings and courses

Breeding with Molecular Markers. 10-11 February 2004, Davis, California, USA

The UC Davis Seed Biotechnology Center and UC Davis Extension are offering a two-day short course on 'Breeding with Molecular Markers' for professionals in the seed industry. The course will

focus on strategies for using molecular tools in different breeding schemes and crops. Participants will learn what technologies are currently available for different crops. Leading industry and university experts will discuss how, when and what types of molecular markers should be used in breeding programs, including marker-assisted selection, accelerated backcrossing, and quantitative trait loci. Hands-on sessions utilizing mapping and marker analysis software are included. For further information and registration, see <http://www.extension.ucdavis.edu/agriculture/index.asp> or email aqinfo@unexmail.ucdavis.edu.

ISTA Seed Symposium 2004. 17-19 May 2004, Budapest, Hungary

The International Seed Testing Association (ISTA) will hold a Seed Symposium under the title 'Towards the Future in Seed Production, Evaluation and Improvement' in Budapest, Hungary, from 17-19 May 2004, as part of the 27th ISTA Congress. This is possibly the largest international gathering of applied seed scientists and offers a unique forum for the interchange of ideas between scientists and technologists. The Symposium will include seven sessions covering the following topics: application of advanced technologies; seed quality systems in emerging and developing economies; organic and conventional seed production; viability and vigour: evaluation and impact; seed lot hygiene; seed improvement; and physiological basis of seed quality. The last session will be held in collaboration with the **International Society for Seed Science**. ISTA invites the submission of both oral and poster papers that have their basis in scientific, technological, or organisational aspects of any of the session topics. Further details of the symposium, guidelines for paper presentation and deadlines for submission can be found on the ISTA website (www.diamond-congress.hu/ista27/). Contact Alison A. Powell (a.a.powell@abdn.ac.uk) for more information.

Master Class Seed Technology. 1-4 June 2004, Wageningen, The Netherlands

The aim of the master class is to offer professional seed technologists the possibility of a further deepening and actualisation of their skills and expertise. Through an intensive in-depth seminar program and informal discussions, coupled to practical hands-on laboratory courses and demonstrations, participants will be challenged with the latest developments in seed technology. The course will enhance participants' ability to make strategic choices in seed technology research and development. Topics of the seminar programme include embryogenesis, Arabidopsis seed genes, dormancy and seed quality, seed stress tolerance, glass transitions, longevity and germination equations, cytology and histology of seed tissues, germination markers, maturation sorting, cDNA micro-arrays, seed proteomics, seed health, seeds for organic farming, priming, molecular identification of seeds and variety protection, seed management and business, seed quality control and statistics, international seed supply systems and property rights.

The master class is designed for professional seed technologists at PhD or postdoctoral level, or those who have acquired an equivalent expertise through experience. Participants may come from industry, research institutes, seed quality laboratories or governmental institutions. The master class will be restricted to 16 participants selected on the basis of their professional background and on the importance of the class programme for their own work. Applicants should have a good working knowledge of English. Those interested are requested to complete and electronically submit the registration form at www.seedcentre.nl before 1 April 2004. Registration through the website will be open in January 2004. To receive a hard copy registration form, please contact:

International Agricultural Centre
Dept. Course registration
P.O. Box 88, 6700 AB Wageningen
The Netherlands
Tel: +31 317 495 495, Fax: +31 317 495 395
Email: training.iac@wur.nl

16th International Conference on Arabidopsis Research. 14-19 June 2005, Madison, Wisconsin, USA.

The 16th International Conference on Arabidopsis Research will be held 14-19 June 2005 at the Memorial Union of the University of Wisconsin, Madison. Check The Arabidopsis Information Resource (TAIR) website (www.arabidopsis.org) for updates on registration and abstract submission.

Plant Membrane Biology - 13th International Workshop. 7-10 July 2004, Montpellier, France.

The 13th International Workshop on Plant Membrane Biology will provide an extensive overview of front-line research in the field of membrane transport, this being addressed within the context of the functioning of the cell and plant. Sessions will be devoted to cell signalling and membrane trafficking, plant-pathogen interactions, adaptation to environmental stresses and plant growth and development. There will be specific emphasis on breakthroughs and emerging concepts in fields such as membrane proteomics and structural biology. Technological advances and bottlenecks will be discussed in specific and interactive round-table sessions. For more information, see: <http://www.montpellier.inra.fr/PMB>. Contacts: Christophe Maurel (maurel@ensam.inra.fr) and Hervé Sentenac (Sentenac@ensam.inra.fr).

American Society of Plant Biologists, Plant Biology 2004. 24–28 July 2004, Orlando, Florida, USA.

The 2004 Annual Meeting of the American Society of Plant Biologists will be held at Disney's Coronado Springs Resort & Convention Center in Orlando, Florida. For information, see the ASPB website <http://www.aspb.org/>.

Federation of European Societies of Plant Biology (FESPB) 14th Congress. 23-27 August 2004, Krakow, Poland

For further information: <http://www.zfr-pan.krakow.pl/konf/>

18th International Conference on Plant Growth Substances. 20-24 September 2004, Canberra, Australia.

Contact Jake Jacobsen (John.Jacobsen@csiro.au), Chairman, Organizing Committee, Plant Industry, CSIRO, PO Box 1600, Canberra, ACT 2601 Telephone: 61 2 62465464 Fax: 61 2 62465000, or see the web site <http://www.conlog.com.au/ipgsa2004>.

● and finally

This item was in the last Newsletter but it is worth repeating: the ISSS is **your** society so please involve yourself in it. If you have any suggestions, complaints, comments etc send them along to your Officers. They want to run the ISSS as best as they can to satisfy the needs of its members. And remember to inform this newsletter about seed science in your lab, country, region etc, including any news about meetings, workshops or courses. Send your news for inclusion in the Newsletter to the editor: Michael Black (michael.black@kcl.ac.uk).

Have a good festive season, and may 2004 bring us all peace, happiness, good health -- and success in seed science!