Seed Tech News

INDIAN SOCIETY OF SEED TECHNOLOGY
ISST
Estd. 1971

ISST: Disseminating Knowledge of Seed Science & Technology

Vol.: 44, No. 4, December 2014

The International Seed Testing Association (ISTA) invites you to its Annual Meeting to be held in Montevideo, Uruguay from 15-18 June 2015. For the 2015 meeting a one-and-a-half day Seminar will be held on *Molecular tools applied to Seed Quality and Seed Health*. This Seminar will be a opportunity to receive the latest research and development. Moreover, we are delighted to announce that two ISTA Workshops will take place: 1. *Seed Sampling and Quality Assurance in Seed Sampling* and 2. *Tetrazolium Testing & Vigour by Tetrazolium in Glycine max.*

For information visit www.ista2015.org

Secretary : SK Jain
Editor : Manjunath Prasad CT

Need for Stewardship Management in Seed Production and Quality Assurance

Stewardship in general is referred in all the industries to those who take care of the responsibility. It is most dynamic and required in every industry to have integrity of the material we deliver to keep the reputation at high stake. Stewardship management is generally defined as the act of conducting, supervising, or managing of something; *especially*: the careful and responsible management of something entrusted to one's care (Merriam-Webster Dictionary). This may, in our seed systems encompass practices, operating procedures and areas consistent with the respective research, development and seed production systems. Thus, farmer is also practicing the stewardship in India and the result today is that "we can find a lot of seed varieties in the seed chain with their original traits intact".

Stewardship is the responsible for ethical management of a product from its discovery through its ultimate use and discontinuation. It is a task for everybody who touches a respective product. It is so designed that all involved need to be pro-active rather to comply with the reactive like Policies, Principles, Plans, Programmes and Processes. In plant biotechnology, stewardship includes careful attention to the responsible introduction and use of products (source ETS).

Most of the time, government machinery interlinks the regulatory policies and the framework, and stewardship thus means the strict act of compliance by all involved in a defined set of activities to ensure the quality and specific nature of the end product. In fact, regulatory system we are talking here is more linked to national environmental and agricultural rules and regulations. Whereas stewardship is primarily associated with the quality management system that may be part of internal, national or international compliance requirements. Stewardship is the one that effectively implements the national regulation in the regulatory phase of the product or technology may be in the contained testing phase or in the trailing phase or seed production or at technology discontinuation phases.

For most of the government systems or officials involved in monitoring the compliance system, regulatory system itself is the stewardship. That is why they combine the regulatory and stewardship issues. Regulatory rules are thus practically implemented by the stewardship. Good stewardship practices contribute to the public confidence, which is central to the acceptance and approval of trait based agricultural biotechnology.

Therefore, the organizations involved in seed production should consider the needs of the market place and customer demands so that the appropriate practices and procedures become a normal part of the seed business process. In fact the components related to tracking, record keeping, testing and other measures with appropriate oversight management systems are essential parts of product development and commercial life cycle for purposes of quality control and seed purity. Since maintaining a seed variety's trueness to type is critical for market acceptance and use, robust quality management practices are needed for both conventionally derived and non-biotechnology derived crops. Thus these components provide structure and rigor to business practices by way of managing key process variables, thereby establishing routine and consistent output from their processes. In addition, these systems facilitate coexistence among growers, meeting customer expectations and mechanisms for continually improving the quality management system.

As advances in seed technology occur and developers gain additional insights into quality management practices through practical implementation, the issues related to trait discovery, product phase-out, product discontinuation or product retrieval also needs to be taken care, including issues associated with product performance after sale. There are general quality assurance considerations that are applicable to all of the processes involved in seed systems. Compliance with regulatory requirements is fundamental to all the stake holders, including those regulations directly related to seed labeling, to phytosanitary requirements and to the use of biotechnology. In addition, training of personnel is relevant to all the processes. Establishing a system of documentation concerning all procedures and records appropriate to the principles ensuring quality assurance is the edifice of stewardship management process. These stewardship initiatives, guidelines and recommendations will not be effective unless they are communicated to seed growers.

In reality, stewardship is not a regulatory requirement. Stewardship covers a broad range of aspects which should not be subjected to regulatory oversight. There is no question that breeders and the seed industry must comply with science-based regulations. A strong regulatory system oversees plant biotechnology, biotechnology product stewardship is the responsibility of each developer, seed producer (both seed industry and seed grower) and user. In fact stewardship ensures good way of doing business, supports mutual trust in collaborations, and improves efficiency and strengthens stakeholder and consumer confidence. On the other hand, stewardship in plant biotechnology is the responsible management of a product from its inception through to its use and discontinuation. It applies across the life cycle of a plant product and includes careful attention to the responsible introduction and use of products. Thus, stewardship management is a programme of continuous improvement; a continuous improvement process is a management process whereby the processes are constantly evaluated and improved in the light of their efficiency, effectiveness and flexibility. In the seed production process, we need to have standard operating and quality auditing procedures in the aspects related to seed grower's selection, production contracting, seed grower training, seed production process and its monitoring, processing, treating, testing, packaging, transport, storing and distribution, apart from product performance after sale to ensure brand performance.

Quality management is a component of stewardship, which comprises the processes and systems to establish and maintain quality in each phase of the product life cycle. Overall aim of the Stewardship approach is to assure responsible and safe use of technology throughout its life cycle and to maximize the benefits from technology products. In this process of achieving total quality management through stewardship management, following points can be the guiding principles:

Take personal responsibility for quality

- Make a commitment to never-ending improvement
- Honor your commitments
- Make a daily "to do" list
- Accept help graciously
- Lead when a leader is needed
- Define excellence for yourself
- Be part of the solution
- Admit your mistakes
- Do your part in the group effort
- Learn to say "I'm sorry"
- Learn something new each day
- Strive for zero defects
- Take charge of morale
- Inspire trust
- Offer suggestions
- Look for opportunities in losses or mistakes
- Accept revisions as proof that someone cares
- Don't gossip or spread rumors

Improve teamwork and commitment

- Know your organization's mission
- Know your team's goals
- Start and end meetings on time
- Be tough on problems—soft on people
- Prepare for "storming" times
- Help your group reach consensus
- Appreciate your team's diversity
- Develop an effective problem-solving process
- Celebrate your success

- Use open-ended questions
- Help with your team's chores
- Share ideas as well as problems
- Use "creative dissatisfaction" as an incentive
- Ignore complaining
- Listen respectfully to each team member
- Empathize with other team members' feelings
- Put into practice "actions speak louder than words"
- Find at least one more solution to every problem

Focus on customers and service

- Define the term "customer"
- Share your expertise
- Use your judgment
- Distinguish between your "job" and your "work"
- Remember, everyone has and is a customer
- Develop friendly relationships
- Help when there's a time crunch
- Listen actively to your customers
- Use customers' names
- Offer to do the job
- Reward customers for giving you their business
- Be prompt in straightening out a problem
- Keep your promises & delivery

Grow

General guidance for the practice of quality management

For product integrity and purity of both biotechnology-derived seed and conventional seed.

Important stages in variety development, seed production and marketing are:

1. Breeding stage
2. Working in seed laboratories or storage facilities
3. Variety and trait testing
4. Breeder seed and seed stock development
5. Seed production operations
   - (i) Planting: Planting and equipment cleaning
   - (ii) Cultivation/husbandry
   - (iii) Harvest and post-harvest
   - (iv) Land use monitoring
   - (v) Seed cleaning/conditioning
   - (vi) Viable plant/seed storage, warehousing and distribution

To practice Quality Management for product integrity and purity of both biotechnology-derived seed and conventional seed, whether in breeding process or working in lab or storage facility and evaluation, we should focus on following:

Analysis of product integrity and control concerns

- Unintended traits at unacceptable level
- Lack of intended traits at desired level
- Improper identification of material and incorrect material
- Maxing of genetic material.
- Loss of genetic material
- Disposition of genetic material
- Error in identification, planting, off-type removal
- Errors in material identification and harvest

Determine control points

- Checking the receipt of seed if received from third party
- Selection of seed and transfer of material prior to planting
- Personnel access to facilities and/or processes
- Movement of material in and out of facility
- Disposition of material
- Sorting, identifying and packaging of material
- Personnel access to facilities and/or processes
- Field/plot selection and identification
- Harvesting, seed handling

Preventive measures

- Establish seed integrity procedures and purity standards
- Handling, control, and proper disposal of packaging materials in GM
- Following site work instructions, processes and SOPs
- Establish procedures for accurate sample and product identity
- Establish defined procedures for equipment maintenance and cleaning in GM
- Establish procedures for germination, physical purity, genetic purity, trait purity confirmation and LLP
- Establish procedures for proper training of all field workers
- Establish procedures for site selection
- Establish appropriate inspection, devitalization and

disposition procedures including rouging and proper disposal of infected/infested material

- Establish seed treatment practices for pathogen control

Establish monitoring procedures

- After receiving the sample and determine material meets specifications
- Utilize a checklist to establish that all needed information is present
- Establish appropriate documentation of records, work instructions and SOPs
- Monitor field at regular intervals so that confinement of the site is in accordance with internal and, if appropriate, regulatory requirements
- Provide supervision of personnel and oversight of the field
- Establish plant disease monitoring procedures
- Training of personnel on plant pest and pathogen identification

Establish corrective measures

- If sourced material does not meet established purity standard and dispose of the material
- If incorrect identity or demarcation of seed is found or if material is lost or disposed of improperly, evaluate deficiencies in SOPs and personnel training and revise
- If genetic material is inappropriately mixed, lost or disposed of improperly, evaluate deficiencies in facility inspections and/or design
- Correction of any deficiencies identified that could affect confinement of the nursery site.
- In the event that seed or plants are incorrectly identified or where identity cannot be confirmed, review and dispose of plants material as appropriate
- Incorporate any corrective measures or procedural changes into SOPs
- Implement control measures for pathogens and pests as appropriate to protect final product at harvest

Establish verification procedures

- Establish and confirm the gate way testing
- Procedure for periodic auditing and assessments through a checklist
- Verify appropriate testing of germination, physical purity, genetic purity, trait purity confirmation and unintended LLP, in addition to other tests as appropriate
- Verify proper analysis for the LLP of an unintended trait
- Verify adequate records and work instructions
- Verify identity and assessment of product purity
- Verify appropriate confinement measures through assessment, field inspection and monitoring after harvest
- Verify volunteer management practices
- Verify equipment clean-out
- Verify personnel practices

Record keeping and documentation procedures

- Establish that documentation of identity, including test results, of the material is accessible, secure and is retained as appropriate
- Ensure adequate documentation of inventory control, transfer and a record of any special instructions or procedures
- Maintain records of project progress and logs of activities
- Maintain records of compliance with specific work instruction, sample and product disposition
- Establish appropriate procedures for retention of records
- Establish documentation procedures for inventory control and transfer
- Maintain records of documentation used to identify plants so that pertinent identification is recoverable
- Maintain record of neighboring practices/activities

Reference

Excellence Through Stewardship (2009). Advancing best practices in agricultural biotechnology.

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Biotechnology Industry Association (2007). Handbook for understanding and implementing the containment analysis and critical control point plan for the production of plant-made pharmaceuticals and plant-made industrial products.

Vilas A. Tonapi, Narayan Bhat[1], Rajendra Prasad S.[2], SK Jain[3] and Manjunath Prasad C.T.[3]

Directorate of Sorghum Research, Hyderabad

[1]Quality and Biotech Stewardship Manager, Syngenta India Ltd.

[2]Directorate of Seed Research, Mau

[3]Division of Seed Science and Technology, IARI, ND 12

ISTA accreditation – Seed Testing Laboratory, The Coimbatore [Lab Code: IN16]

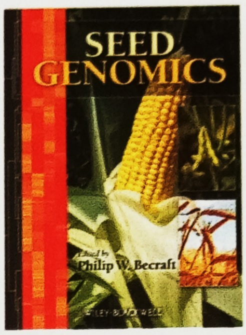
The Seed Testing Laboratory of Coimbatore in the state of Tamil Nadu in India is one of the oldest seed testing laboratories in India established in 1964. This laboratory now in its 50th year after its inception is part of the Department of Seed and Organic Certification,Tamil Nadu that has been functioning to test seeds received from the certification and inspection wings of the Department as well as from the seed producers, dealers and farmers for the past 50 years.

The accreditation now awarded by ISTA is due to the continuous strenuous efforts beginning from the lab becoming a member of ISTA in 2007. After 7 years of perseverance this lab bearing the ISTA member lab number IN16 could secure the accreditation in 2014. The efforts put in by the agricultural officers Mr. R. Jawahar, Ms. E. Nirmala, Ms. C.N. Akila , Ms. A. Vanathi and Mr. P.S. Arulvadivu under the guidance of Mr. M.V. Mohanasundaram, Seed Testing Officer, includes first, the successful participation in five consecutive Proficiency Tests from 2012-2013. This was possible by the continuous studies of the ISTA Rules, handbooks for various testing and discussions held among the technical staff to improve their competency in testing seeds to the level of ISTA. Secondly the IN16 implemented the quality system in its daily functioning of the lab based on the ISTA Accreditation Standards. The IN16 lab procured and uses the precision instruments as stipulated in the ISTA Accreditation standards with proper calibrations.This finally led to the application for ISTA accreditation by the lab leading to an on-site assessment by the ISTA auditors on 27.1.2014. The two auditors from ISTA secretariat thoroughly audited both the quality system in function and also the technical competency of the agricultural officers of the IN16. They found a few substantial non-conformities that were addressed by the IN16 within the appropriate time schedule and approved by the auditors. Finally the IN16 lab was granted accreditation by the ISTA Executive Committee on 3.6.2014.

This accreditation is a recognition of the high competency level of the personnels and also the high level of quality management system functioning in the lab, making it stand proud among the other government seed labs in India.

Mr. M.V. Mohanasundaram
Seed Testing Officer, STL, Coimbatore

New Publications



Seeds: Ecology, Biogeography, and, Evolution of Dormancy and Germination

Carol C. Baskin and Jerry M. Baskin

2 edition, 2014, 1600p, Academic Press

ISBN: 978-0124166776

150.0 USD

The second edition of the book contains new information on fruit/seed heteromorphism, breaking of physical dormancy and effects of inbreeding depression on germination. New topics have been added to each chapter, including dichotomous keys to types of seeds and kinds of dormancy; a hierarchical dormancy classification system; role of seed banks in restoration of plant communities; and seed germination in relation to parental effects, pollen competition, local adaption, climate change and karrikinolide in smoke from burning plants.

The database for the world biogeography of seed dormancy has been expanded from 3,580 to about 13,600 species. New insights are presented on seed dormancy and germination ecology of species with specialized life cycles or habitat requirements such as orchids, parasitic, aquatics and halophytes. Information from various fields of science has been combined with seed dormancy data to increase our understanding of the evolutionary/phylogenetic origins and relationships of the various kinds of seed dormancy (and non-dormancy) and the conditions under which each may have evolved. This comprehensive synthesis of information on the ecology, biogeography and evolution of seeds provides a thorough over view of whole-seed biology that will facilitate and help focus research efforts in seeds.

Source: http://store.elsevier.com

Notification

Ministry of Agriculture (Department of Agriculture and Co-operation), Govt of India

New Delhi, the 23 September 2014

S.O. 2480(E)-In exercise of the powers conferred by clause (a) of Section 6 of the Seeds Act, 1966 (54 of 1966), the Central Government after consultation with the Central Seed Committee hereby makes the following amendment in the notification of the Government of India in the Ministry of Agriculture published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) vide number S.O. 1041(E), dated 28 December 1993, namely:

2. In the said notification, in the table after serial number 6 and entries relating thereto, the following serial number and entries shall be inserted, namely:

SNo	Crop	Genetic Purity Standard (%)
1	2	3
"7.	Rapeseed and Mustard	85%"

3. This notification shall come into force on the date of its publication in the Official Gazette and shall remain in force for a period of two years from the date of its coming into force.

Sd/-

Sanjay Lohiya, Joint Secretary

[F.No. 15-13/2014-SD. IV]

Note: The principal notification was published in the Gazette of India, Extraordinary, Part-II, Section-3, Sub-section (ii) vide notification S.O. 1041(E), dated the 28 December 1993.

New Delhi, the 23 September 2014

G.S.R. 890(E)-In exercise of the powers conferred by Section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following Order further to amend the Seeds (Control) Order, 1983, namely:

1. (1) This order may be called the Seeds (Control) Amendment Order 2014.

   (2) It shall come into force on the date of its publication in the Official Gazette.

2. In the Seeds (Control) Order 1983,

   (a) in paragraph 4, relating to 'Application for license', for the words "a fee of rupees fifty", the words "a fee of rupees one thousand" shall be substituted;

   (b) in paragraph 7, relating to 'Renewal of license',

   (i) in sub-paragraph (1), for the words "a fee of rupees twenty", the words "a fee of rupees five hundred" shall be substituted;

   (ii) in sub-paragraph (2), for the words "additional fee of rupees twenty five", the words "additional fee of rupees five hundred" shall be substituted.

Sd/-

Rajesh Kumar Singh, Joint Secretary

[F.No. 13-49/2014-SD. IV]

Note: The Principal Order was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) vide number G.S.R. 932(E), dated the 30 December 1983 and subsequently amended vide number G.S.R. 444(E), dated the 26 July 2006.

Editorial Contact Information

Please send us information related to any news, new projects, opinions on policy issues, current happenings, publications, book reviews, foreign visits, new appointments, trainings, seminars, workshops and conferences or other interesting stuff related to seed for the next issue of Seed Tech News.

Suggestions and comments are welcome!

Editor

seedtechnews@gmail.com

INDIAN SOCIETY OF SEED TECHNOLOGY

DIVISION OF SEED SCIENCE & TECHNOLOGY

Indian Agricultural Research Institute, New Delhi-110012 (INDIA)

Estd. 1971

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To,

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Division of Seed Science & Technology
Indian Agricultural Research Institute
New Delhi 110 012 (INDIA)

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I am interested in becoming the member of the Indian Society of Seed Technology. Therefore, I am remitting a sum of Rs. .... (In words: ....) by cash/demand draft, towards Membership Subscription plus Registration Fee.

Date : ....

Yours faithfully,

....
Signature

USE BLOCK LETTERS

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3. JOB TITLE
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KIND ATTENTION!

All the existing members are kindly requested to update their membership details (Sl. No. 1 to 9 given to left here) to ensure that all correspondence from ISST is delivered correctly. In recent past ISST have received undelivered posts/letters/ correspondence. This is urgently required to update the complete membership mailing list.

Please share the information with colleagues and friends who are already members of ISST.

Send the details as soon as possible by e-mail secretaryisst@gmail.com or seedtechnews@gmail.com
Regards,

Secretary, ISST

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Please send the completely filled-in Membership Subscription Form along with Cash/Cheque/DD Payable to Indian Society of Seed Technology by hand/speed or registered post to **Secretary/Treasurer, Indian Society of Seed Technology, Division of Seed Science & Technology, Indian Agricultural Research Institute, New Delhi 110 012.**

Thesis Abstracts

PhD

Evaluation of genetic purity and seed enhancement treatments in cotton hybrids and parental lines

In the recent years there has been phenomenal increase in the area and production of cotton hybrids in India. With the development of new hybrids, there is need for more effective technology to ensure the highest seed quality including genetic purity of these hybrids, as the genetic improvements are delivered through seeds at an increased cost to the growers. Keeping this in view, studies on above was carried out in the Division of Seed Science and Technology, IARI. 40 SSR markers were used to test the genetic purity of cotton hybrids namely; DCH-32, RAHB-87 and their parental lines. Out of these, eight primer sets namely, BNL 169, BNL 2590, BNL 2895, BNL 840, BNL 3103, BNL 2544, BNL 2572 and BNL 3441 were found polymorphic differentiating hybrids from their parental lines. Thus, these SSR primers can be used for quick and reliable method for genetic purity testing of above two hybrids. Non-*Bt* hybrids had higher vigour owing to higher seedling length and dry weight. However, there was no significant difference in the germination percent of these two hybrids. Before the storage, the seeds treated with cruiser (94%) and azotobacter + microphos (93.5%) exhibited higher germination % over all other treatment and after 12 months of storage, seed treated with azotobacter+ microphos @10g/kg of seed recorded highest first count (79%), germination (88.6%), seedling dry weight (0.236g), vigour index I (2651) and vigour index II (21.0). In the field, seeds treated with azotobacter+ microphos (10 g each/kg of seed) and thiram+ imidacloprid (2.0 g/kg seed + 7.5 ml/kg seed) proved to be best treatment in terms of high field emergence, early initiation of flowering, 50% flowering and 50% boll opening. Spacing of 75X60 cm was found to be significantly superior over 75X75 cm and 75X30 cm as it resulted in earlier initiation of flowering, increase in field emergence and yield per plant.

Name of the student: **Menka**
Name of the Major Supervisor: **Dr SK Yadav**
Division of Seed Science and Technology
IARI, New Delhi 110 012

MSc

Relation of seed quality characters to emergence and crop performance in gardenpea (*Pisum sativum* L.)

The relationship between seed quality characters and field emergence of 21 seed lots of three garden pea cultivars Pusa Pragati, Arkel and Azad P3 was evaluated during *rabi* 2011-12. These lots were evaluated by the following laboratory vigour tests: germination, vigour index, accelerated ageing (AA), electrical conductivity (EC) and tetrazolium test. The vigour tests were able to assess vigour differences among the seed lots of all three varieties. The standard germination percentage for these lots ranged from 74 to 91%. The seedling emergence percentage in the field ranged from 18 to 64% for these seed lots. The seedling emergence percentage of garden pea seed lots was positively and significantly correlated with standard germination (r = 0.618**), vigour index I (r = 0.599**), vigour index II (r = 0.575**), Tetrazolium test (r = 0.576**) and accelerated ageing (r = 0.560**). The electrical conductivity test (r = –0.721 **) was significantly and negatively correlated with field emergence. The R^2 value for electrical conductivity test (0.52**) was found to be significant followed by standard germination test (0.38**), vigour index I (0.35**), vigour index II (0.33**) and tetrazolium test high vigour lot (0.33**) in predicting the variations in the field emergence of pea seed lots under study and it explained 52%, 38%, 35%, 33% and 33% of the variation in field emergence, respectively. These results suggest that the EC test followed by standard germination test and vigour index I have good potential in predicting the seedling emergence of garden pea seed lots.

In another experiment, fresh high germination lots of garden pea cv. Pusa Pragati was subjected to AA for different durations so as to obtain three lots of high, medium and low vigour levels. These lots so obtained were subjected to presowing treatments *viz.* hydropriming, halopriming (50 mM KNO_3), halopriming (50 mM $CaCl_2$), ethanol (0.5%) priming along with control. The high vigour lot after hydropriming showed significantly highest germination (96%) and seed yield (15.79 q/ha). Maximum emergence (69%) was recorded in high vigour lot after treating with 50 mM $CaCl_2$. Halopriming with 50 mM $CaCl_2$ improved field emergence of high vigour lots by 12%, whereas hydropriming improved emergence by 13.3% and 8.0% in medium and low vigour lots over control, respectively. The results suggest that hydropriming and halopriming with 50 mM $CaCl_2$ can be successfully used to improve planting value of aged garden pea seed lots.

Name of the student: **Prasanna Prabhakar**
Name of the Major Supervisor: **Dr VK Pandita**
Division of Seed Science and Technology
IARI, New Delhi 110 012

Edited and published by: **Manjunath Prasad CT** on behalf of the Indian Society of Seed Technology, Division of SST, IARI, New Delhi 110 012, e-mail: seedtechnews@gmail.com and printed at M/s. Kamala Print-n-Publish, O 96 New Mahavir Nagar, New Delhi 110 018
Phones : 98184 76511; 2599 7481

Price : Rs. 18/-

Registration No. 21893/71