



**Seed Captain**®

**Program Manual**

**MODULE SEED PRIMING, DORMANCY &  
ENHANCEMENT**

**26-30 September 2011**

**Taichung, Taiwan**

*In co-organization*



國立中興大學  
National Chung Hsing University

*In-cooperation*



WAGENINGEN UNIVERSITY  
WAGENINGEN UR



## **OVERVIEW AND AIM OF THE MODULE**

Improvement of germination by conditioning (priming) of seeds in water or osmotics has been known for many years. Primed seeds can germinate faster, more uniform and under a broader range of environmental conditions than the non-primed ones, but shelf life may be reduced. Therefore skilled staff is needed to maximize the advantage of this technology.

This module will provide a deeper insight in seed priming, an important physiological enhancement method and its relation to seed germination and seed dormancy breakage. Theory and practicum will combine basic as well as some advanced technologies in seed priming. Types, priming controlling methods used for seed conditioning in order to accelerate the rate of germination and to improve seedling uniformity, will be described in details. Processes happening in the seed will be discussed on the physiological and molecular level.

### **Theoretical aspects that will be addressed**

- Aim of seed priming (initial, short)
- Priming methods
- IP restrictions to certain methods
- Physiological processes happening during priming
- Priming markers
- How to test priming efficiency
- Invigoration by priming
- Over-priming
- Drying after priming
- Storability
- Advantages and disadvantages of priming
- Economic factors

### **Practical and discussion**

- Demonstration of priming
- Build your own priming device
- Calculation and preparation of osmotic solutions
- Literature and internet search on priming of your crop of choice
- Calculate economic potential of your priming plan
- Oxygen consumption (Q<sub>2</sub>) with primed and non-primed seeds.
- Ethanol analysis of primed and non-primed (invigoration) poor quality seeds
- Discuss results of priming tests (based on data from priming tests that have to be performed in advance)
- Discussion on what priming technique to use for your crop and seed lot
- Discussion on when priming yourself or by third parties
- Prepare an initial priming protocol and planning

## **TENTATIVE MODULE**

### ***Day 1: Monday 26 September 2011***

- Intro of the course, official opening and overview
- Lecture 1: Introductory overview of hydration treatments
- Intro participants and questions/needs
- Seed priming practicum 1: Hands-on training and demonstration; building priming device
- Wrap up discussion

### ***Day 2: Tuesday 27 September, 2011***

- Lecture 2: Quality processes
- Lecture 3: Quality assessment, methods and metrics
- Lecture 4: Seed biology I
- Seed priming practicum 2: hands-on training and demonstration; Q2, ethanol and priming
- Seed priming practicum 3: hands-on training and demonstration; drum priming
- Seed priming practicum 4: hands-on training and demonstration; calculation of osmotic solutions
- Wrap up discussion

### ***Day 3: Wednesday 28 September, 2011***

- Lecture 5: Commercial production technology system
- Lecture 6: Seed biology II
- Lecture 7: Drying technologies
- Seed priming practicum 5: hands-on training and demonstration; Osmotic priming
- Discussion: Priming methods
- Discussion: Literature and internet search
- Wrap up discussion

**Day 4: Thursday 29 September, 2011**

- Lecture 8: Agro/economic case for priming
- Lecture 9: Seed biology III
- Lecture 10: Technology adoption and commercial considerations
- Seed priming practicum 6: hands-on training and demonstration; calculate economic potential
- Discussion: What if priming by third party?
- Discussion: Repeatability and protocols

**Day 5: Friday 30 September, 2011**

- Lecture 11: Crop case studies: lettuce and sugar beat
- Discussion: Results of priming tests
- Intro Seed Captain Drying & Storage
- Final discussion and answers to questions/needs (from day 1)
- Official closing
- Departure to Kaohsiung/ Taipei

## SPEAKERS/ TRAINERS



**Dr. Henk WM Hilhorst**, Associate-Professor Laboratory of Plant Physiology, Wageningen Seed Lab, Wageningen UR

Major interest on Mechanism and control of seed dormancy and germination;  
Mechanism and control of seed desiccation tolerance  
Extensive research and publication related to seed dormancy and priming

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**Dr. Peter Halmer**, Seed enhancement consultant, previous the Research and Development Director for Germain's UK.

More than 30 years experience in the field of seed priming and enhancement.  
Co-author of The Encyclopedia of Seeds : Science, Technology and Uses

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**Dr. Henry Bruggink**, Senior Research Technology Specialist at Incotec, *The Netherlands*.

Responsible for: Upgrading and Priming (new technology development)  
Past experience: X-ray upgrading tomato, priming tomato, priming tomato rootstock, priming various Cucurbits

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**Ir. Johan Van Asbrouck**, Rhino Research Group, Thailand

More than 35 years of experience in seed technology research, especially in training and setup of new top technologies for seed companies.

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**Dr. Yu Sung**, Associate Professor, Department of Horticulture National Chung Hsing University

Specialty in Seed Physiology and vegetable production  
Research on heat dormancy, germination physiology and growth; and development of vegetable seedlings

## **TAIWAN'S VISA**

For Taiwan's visa requirement, please check at the link

<http://www.boca.gov.tw/ct.asp?xItem=1443&ctNode=536&mp=2> and confirmation with Republic of China (ROC) consulate or representatives in your country is advised.

Kindly inform us for issuance of invitation letter if required.

## **TRAVEL SUGGESTION**

For international participants arriving at Taipei (TPE) or Kaohsiung (KHH) International airports, the convenient way to reach Taichung is by trains and there are 2 rail systems are available;

- By HSR trains

Taiwan High Speed Rail (THSR) trains: <http://www.thsrc.com.tw/en/?lc=en>. All Taiwan High Speed Rail (HSR) trains between [Taipei](#) and [Kaohsiung](#) stop at Taichung.

- By TRA trains

Taiwan Railway Administration (TRA) train schedule:

[new.twtraffic.com.tw/TWRail\\_EN/index.aspx](http://new.twtraffic.com.tw/TWRail_EN/index.aspx)

## **ACCOMODATION** (will be booked and paid by the organizer)

- Hotel will be announced soon

## **WHO SHOULD PARTICIPATE?**

- ✓ Everyone who is a professional seeds men can apply, a minimum knowledge on seed is however a must and a minimum understanding on seed technology is an advantage.
- ✓ Course is given in English, a decent understanding in English is necessary in order to follow the course.
- ✓ Participants may be affiliated with industry, research institutes, seed quality laboratories, universities and other governmental institutions.

The class will be restricted to 20 people maximum and 10 people minimum.

## ENROLLMENT

The module fee is \$ **2,600**. Included in this fee are:

- Course fee
- Lodging (25/9/2011 - 30/9/2011)
- Food costs
- Course materials
- Use of equipment and consumables during the training

The number of participants is limited to **20 participants** and first come first served basis will apply

For enrolment, please wire the course fee to:

**Account : RUNG RUENG CONSULTING**

**Account No : 323-0-994893**

**Swift Code : BKKBTHBK**

**Bank : Bangkok Bank Branch : Phichit**

**Bank Address : 16 Simala Road, Tambon.Nai Muang Amper.Muang Phichit 66000**

**Bank Telephone: +66 56 611573 , +66 56 611053**

(Please add your name – company or institution and country, as well as your mobile number and/or email)

## HOW TO APPLY

Complete the Seed Captain Program application form

1. Online application ([Click here](#))
2. Scan and email/fax us the application form (attached).

## CONTACT US

For further information, please do not hesitate to contact:

**Selvan Selvakumaran**

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Cell : (+6) 0 18 6622 361 / (+66) 80356 8804

Email : [selvan@internationalseedacademy.com](mailto:selvan@internationalseedacademy.com)

REGISTRATION FORM



SEED CAPTAIN PROGRAM:  
MODULE SEED PRIMING, DORMANCY & ENHANCEMENT  
26-30 SEPTEMBER 2011, TAICHUNG TAIWAN

<b>Company</b>	
<b>Mr./Ms./Mrs.</b>	
<b>First name</b>	
<b>Last name</b>	
<b>Position</b>	
<b>Address</b>	
<b>Email address</b>	
<b>Telephone number</b>	
<b>Fax number</b>	
<b>Area of expertise</b>	

<b>Billing Address</b>	
<b>VAT Number</b>	
<b>Date of payment</b>	

<b>Meals</b> (Vegetarian/Non vegetarian)	
<b>Date of Arrival</b>	
<b>Date of Departure</b>	