

FINAL REPORT

5th INTERNATIONAL MASTER CLASS ON SOIL BORNE PATHOGENS OF WHEAT

11-23 July 2016

Prepared by Dr Abdelfattah A. DABABAT

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SPONSORS & CONTRIBUTORS



Australian Government
Australian Centre for
International Agricultural Research



Research
Program on
WHEAT



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Special thanks go to the generous donors including **Syngenta AG**, **The Crawford Fund** (Australia), the Australian Centre for International Agriculture Research (**ACIAR**), the Australian Grains Research and Development Corporation (**GRDC**), the International Maize and Wheat Improvement Center (**CIMMYT**), the Turkish Ministry of Food, Agriculture and Livestock (**MFAL**) and the **Dikmenfide** Company.

Special thanks to the soil borne pathology (SBP) CIMMYT team in Eskisehir especially Dr Gul Erginbas-Orakci (Research Associate) for the huge efforts she made to prepare the needed materials for the course and the day-to-day follow up with the needs of the participants and presenters. Thanks also go to the local office coordination staff in the CIMMYT office in Turkey especially Ms Bahar Erdemel (CIMMYT Finance and Office Coordinator) and Mr Suleyman Erharat (CIMMYT Logistician).

Thanks to the CIMMYT Global Wheat and CRP Director Dr Hans-Joachim Braun for his unlimited support to this master class. CIMMYT's country liaison officers (in the regions are thankful for their support to this course especially Dr Joshi Arun for supporting the Indian participant with his airfare. Thanks to Dr Hafiz Muminjanov from the Food and Agriculture Organization of the United Nations (FAO) for supporting the Kazakh PhD student with her airfare.

Special thanks go to key people from Syngenta who financially supported this course; especially the nematology group leader Dr Brigitte Slaats, Dieter Hofer and Dr Dietrich Hermann (CP R&D Lead Cereals) and the global technical manager nematicides, Dr Matthias Gaberthueel.

Thanks to the research program manager at ACIAR, Dr Eric Huttner, for the great support and to manage to get funds to support this important course. We thank the CRAWFORD Fund, especially Dr Denis Blight and the director of training and master classes, Dr Colin Chartres, for their efforts to support this course.

Thanks to Dr Julie Nicol for her assistance and guidance throughout the master class. Her support and follow up with Australian donors and presenters to support the course is much appreciated.

Finally special thanks go to the instructors who gave their valuable time to come and teach in this course, especially those came from outside the country including Dr Timothy Paulitz (USA), Dr Grant Hollaway (Australia), Dr Ian Riley (Australia) and Dr Dietrich Hermann (Germany). We thank ICARDA's colleagues Dr Mesut Keser and Dr Nazari Kumarse for their teaching on rust breeding and rust diseases, respectively. We also thank our Turkish colleagues Prof Hakan Ozkan (Cukurova Uni), Prof Aziz Karakaya (Ankara Uni), Prof Berna Tunali (19 Mayıs Uni), Dr Zafer Mert (MAFL) and Dr Gul Erginbas-Orakci (CIMMYT).

INTRODUCTION

5th INTERNATIONAL MASTER CLASS ON SOIL BORNE PATHOGENS OF WHEAT

Abdelfattah A. Dababat, Timothy Paulitz, Grant Hollaway, Ian Riley, Gul Erginbas-Orakci

The 5th International Master Class on Soil Borne Pathogens of Wheat was held at the Transitional Zone Agricultural Research Institute (TZARI), Eskisehir, Turkey, on 11-23 July 2016.

During the opening ceremony, 45 representatives from 16 countries were welcomed by Yusuf Aslan, Head of Field Crop Research, Turkish Ministry of Food Agriculture and Livestock (MFAL), Suat Kaymak, Plant Health Department Head, MFAL, Dr Sabri Cakir, TZARI director and Amer Dababat, leader, Soil Borne Pathogens Program at CIMMYT-Turkey.

A total of 15 experts gave presentations with three key renowned experts from abroad (Dr Timothy Paulitz, USDA-ARS, Pullman, WA (USA); Dr Grant Hollaway, Cereal Plant Pathologist, Australia; and Dr Ian Riley, Nematologist, Australia).

The key purpose of this fifth class were to 1) continue to 'build-on existing' and develop 'new' capacity of Soil Borne Pathogen (SBP) researchers in the Center and West Asia and North African regions to improve their capacity to understand better and work with SBP of cereals. 2) assist the political and food insecure West Asian regions – in particular Syria, Iraq, North Africa, and Afghanistan to re-build capacity in this discipline, and to 3) refine the already existing Master Class Theoretical Manual (approx. 220 pages) into a published document for this Master Class and serve as electronic version for future training activities.

This intensive residential Master Class was highly effective and contributed to our science by strengthening and widening the knowledge of young researchers/scientist from the region. Upon their return to their home countries, the students will become involved in researching SBPs which will ultimately benefit farmers and the industry.

The quality of the scientific program and the participation of SBP specialists from various countries made it highly successful course.

This 5th Master Class built on four previous intensive training courses, each running for two intensive weeks on SBP of wheat. Two of these were in Turkey (2000, 2010), one in China (2005) and one in Tunisia (2008). The Turkey and Tunisian courses had a strong West Asian and North African focus, whilst the China course was country specific. All courses were professionally run with world experts and were funded by various donors.

During the class the trainees had the chance to learn how to;

1. Isolate, extract and identify SBP to properly diagnose their SBP problems
2. Understand the methodologies to scientifically establish the loss of one or several of these SBP
3. Understand the possible control options for the different SBP, with an emphasis on the use of host resistance and other environmentally friendly control methods

4. Understand the principles of incorporating resistance of SBP into an active cereal breeding program.
5. Understand the application of molecular biology both in the identification of the pathogens and the breeding of disease resistant germplasm against the identified SBP
6. Contribute to increased research and project writing capacity building in their home organisation
7. Further develop your research management, technical and personal skills
8. Establish a regional network of pathologists with key CG pathologists in the region who may work on these SBP.
9. Acquire additional international contacts.

This will be very important for the future work and linkages between this program and other national institutes in the regions and will ultimately better help to tackle the SBPs and to alleviate hunger and contribute to food security.

This latest course was coordinated and organized by Abdelfattah Dababat, CIMMYT-Turkey, SBP Specialist, as part of the ICARDA CIMMYT Wheat Improvement Program (ICWIP), and funded by CIMMYT, MFAL, Syngenta, The Crawford Fund, ACIAR, and GRDC.

For more information, please contact Abdelfattah A. Dababat (a.dababat@cgiar.org).

OBSERVATION FROM KEY PRESENTERS DURING THE COURSE

Observation on the 5th International Masterclass on Soil-Borne Pathogens of Wheat

Turkey 11 to 22 July 2016

Dr Timothy Paulitz

The following is a brief summary/evaluation/reflection of my experience as an instructor in this course. This is the second time I taught at this Master Class Course, the first time was in 2010. Overall, the 2016 course was an improvement on the previous one, which is expected as the organizers and instructors gain more experience, and learn what works and what does not work. But going into it, there were more challenges this time around- a number of the people who were going to participate did not get permission to travel because of the situation in the country, which meant that the remaining instructors really had to step up to the plate to fill in the missing pieces. Having the coup happen in the middle of the course also created challenges of having to reschedule things and improvise. I commend our Turkish hosts at the research station for minimizing the potential impact of these events.

First of all, a few comments on the students. This was an improvement from the last time, both in numbers and quality. We had over 30 students this time. They were younger, and more female- I think almost half. The students were all highly motivated, and had better English skills than before. They were also more willing to engage and share with the instructors, maybe because of better language skills, but also because they had a high degree of curiosity and craving for new knowledge and advice. Many of them face enormous challenges in their home countries, in terms of lack of resources, infrastructure, cultural barriers, and trying to do relevant field research with knowledge that can be transmitted to the farmers and benefit their lives. This time, we really tried even more to engage the students in an interactive dialogue, rather than just lecturing at them for an hour or so. We were more successful at this in this course. I was also impressed with the ability of the students to network and develop a project in a short period of time. Of course, 6 years later, social media and the internet have advanced much further into their countries, to the point that most of the students used this medium. I think that besides giving the students badly needed knowledge, information, and training; the other tangible outcome of this Master Class is the networks that were built among the students and potential networks for CIMMYT to develop within the countries. I could see this, for example, among the North African group, mostly women, with connections among Tunisia, Algeria, and Morocco. I know that Morocco wants to host the next 6th International Cereal Nematodes Symposium, and see this network coming into play. Another observation was the quality of the molecular skills of some of the younger scientists who have been trained in other countries.

One challenge that we faced both times- the balance between trying to cram in as much as possible, but not making it too strenuous. We had a pretty tight schedule, starting at 8 in the morning and sometimes continuing until 9 at night. We wanted to give the

student time to present on their backgrounds and research, and also wanted to have time at the end to present the projects. Having more students this time meant an even tighter schedule. It was certainly an intense course, but most of the students did not complain. The students used the down time to interact with each other, in the guesthouse often past midnight. The course evaluations that we did at the end gave us important information for the next time, and pointed to ways we can tweak the organization.

I also hope that this mentoring can continue in the future. We can impart on them knowledge and information, but also a perspective of seeing the forest through the trees, so to speak, and how to look at the big picture and ask the really important questions. Many times, I see younger scientists, as I did, basing experiments on the technology that you have and what you know how to do, but end up recreating the wheel over and over again. Part of it is a lack of access to the literature, to be able to know whether something has been done or not. But some of it comes from experience and wisdom, to be able to start with the question, and then work backwards to how to answer it.

Observation on the 5th International Masterclass on Soil-Borne Pathogens of Wheat, Turkey 11 to 22 July 2016

Dr Grant Hollaway

I am a senior research scientist with more than 20 years' experience in field based research into the impacts and management of diseases of field crops. Much of my research has focused on soil-borne diseases of wheat, with an emphasis on both crown rot and root lesion nematodes. I have published 31 referred scientific publications, with 12 of these on soil-borne pathogens.

This was my first involvement in an international Master Class. In spite of this, following a late withdrawal of another presenter I, with other presenters, I was able to fill the gap through increased teaching responsibilities. The support provided to me by both the other presenters and students enabled the effectiveness of my teaching to be optimized.

I was exceptionally impressed with the students on the Master Class. They were young and enthusiastic plant pathologists. They were all active researchers and therefore in a position to apply their learnings on return to their respective countries. The students were passionate about agriculture and what they can do to contribute in their own country. They were very engaged in the Master Class. The excellent interaction among the student group showed that they will most likely maintain collaborative links on return to their respective countries. This clearly demonstrated that the Master Class organizers have carefully selected the participants.

From the students it was evident that crown rot and nematodes were the most important challenges facing wheat farmers in their regions. The level of understanding of the importance of different root diseases in the regions varied from one country to another. Some regions have a good understanding of the most damaging soil borne pathogens, while in other areas basic survey work was still required. The students were provided with skills that will enable them to progress the work required in their regions. I encouraged students to work towards the development of collaborative links to further the research objectives for their countries as many of the challenges facing agriculture are large and are best addressed through strong collaboration.

The teaching facilities at Eskisehir were very convenient with accommodation, dining hall, lecture theatres, laboratories and field research all based at the one location. With students accommodated in the one guesthouse there was ample opportunity for interaction between students and the presenters.

As shown in the program I presented on a range of topics, with a focus on crown rot.

Following on from the workshop I have established a collaboration with Dr Kumarse Nazari to screen Australian wheat cultivars for their reaction to rust at ICARDA's facility in Turkey. This will provide important information to the Australian wheat industry on the potential effects of the Warrior stripe rust strain that is now important in Europe. I have also maintained contact with many of the students on the Master Class.

Thanks to the Crawford Fund for their support in enabling me to participate in this master class and Julie Nicol for facilitating my participation.

Observations on the 5th International Masterclass on Soil-Borne Pathogens of Wheat, Turkey 11 to 22 July 2016

Dr Ian Riley, University of Adelaide, Australia

Facilities and Resources: Based on the success of first and fourth master classes, the recent master class was again held at the Transitional Zone Agricultural Research Institute, Eskisehir, Turkey. The facilities had been upgraded since the previous master class in 2010, including meeting rooms, laboratories, guesthouse and dining room. These upgrades were of significant benefit for the training and the experience of the participants. The support of the Ministry of Food, Agriculture and Livestock and CIMMYT staff was generous and contributed to smooth running of the master class.

Program: The program was modeled on the previous master classes (with valued input from Julie Nicol, who was unable to attend) incorporating changes to accommodate available trainers and current content focus. The recent situation in Turkey, and the region, meant that some trainers (Aust. and USA) were unable to travel to Turkey. Also, sudden illness of one trainer (Turkey) and events in Turkey meant the program had to be adjusted at the late planning stage and during the master class itself. Although this would have had some impact on what was achieved, this impact was well managed and did not undermine the overall delivery and quality of the training.

Trainers: In addition of the experienced international trainers from previous master classes, the inclusion of Grant Hollaway (Aus) with Crawford Fund support proved highly successful. Grant brought enthusiasm and a wide range of practical experience that was highly valued by the participants. Tim Paulitz and Grant competently covered areas that were to be delivered by some trainers that could not attend. Amer Dababat and myself covered nematology topics including those which were to be delivered by the other absent trainer. Other training, including parts of the practical sessions, was competently provided by Turkish and CIMMYT staff. So overall, and despite the impacts of the current situation in the region, the training team consisted of scientist of broad experience and knowledge, a team that was greatly appreciated by all participants.

Participants: The participants included mostly early career scientist from West Asia and North Africa. A careful selection process had led to an excellent group of trainees with adequate to high level of English language competence and high levels of enthusiasm, and from roles/contexts where the training provided will undoubtedly have beneficial impact on their research and career development.

Training: The final program delivered training that was both broad, to accommodate the diverse backgrounds of the participants, and focused on current and critical issues, to ensure all participants were extended. Despite these master classes providing relatively intense training, which would have been a new experience for most of the participants, all participants embraced this with enthusiasm and will have undoubtedly left greatly enriched by the experience. This would be not only be from the content itself, but also from the experience of interacting with peers from their region and with the international trainers who modeled passion for their research and a desire to see outcomes for

farmers. Participant group activities worked particularly well this time, with groups having extra time (due to unplanned program changes) to develop and deliver their project proposals.

**Observations on the 5th International Masterclass on Soil-Borne Pathogens of
Wheat, Turkey 11 to 22 July 2016**

Dr Dietrich Hermann, Syngenta

As a representative to Syngenta (main donor) to the 5th Master Class on SBP of Wheat I was impressed with the excellent organization of this course and the wide range of international participants especially from the Central and West Asia and North Africa (CWANA) region with almost a ratio of 50% young females participating in this course. The international instructors (USA, Australian, CIMMYT, ICARDA) and the local instructors (Turkish) who had taught this course made it a significant success due to their extensive experiences in biology and control of wheat soil borne diseases.

The course includes a good mixture of theory, practical training and group work establishing funding proposals for applied science in the area of soil borne pathogens. I gave a detailed presentation, entitled "*Seed Treatment to Control Soil Borne Diseases at Syngenta*", which covered seed treatment R&D approaches from glasshouse to field testing and use strategies against soil borne diseases and nematodes with main focuses on cereals. The participants were demonstrated benefits of newer chemical and biological seed treatment products in the Syngenta pipeline. We discussed the importance to integrate technologies under an IPM strategy, like variety resistance and chemical control by seed treatment with suitable agronomic measures to reduce the impact of soil borne pathogens in their regions. The benefits of seed treatment on aspects like early plant vigor and root health were illustrated.

I do believe organization of such events in areas where soil borne diseases play an important role especially in the CWANA region would further promote the importance of CIMMYT in supporting cereals production and give an opportunity for young scientists from those regions to learn how to diagnose those diseases and ultimately find the best control options.

I enjoyed the contributions of renowned specialists from Australia and the US, but also the energy shared by the students in their short presentations. The course with its international participation was an excellent example of learning and working across boundaries.

ACRONYMS

CIMMYT	International Maize and Wheat Improvement Centre
CGIAR	Consortium of International Agricultural Research
FAO	Food and Agriculture Organization of the United Nations
GRDC	Grain Research & Development Corporation
ACIAR	Agriculture Center for International Research
ICARDA	International Centre for Agricultural Research in the Dryland Areas
ICWIP	ICARDA CIMMYT Wheat Improvement Program
IWWIP	International Winter Wheat Improvement Program
MFAL	Ministry of Food, Agriculture and Livestock
SBP	Soil Borne Pathogens
TZARI	Transitional Zone Agricultural Research Institute
USDA-ARS	United States Development of Agriculture – Agricultural Research Service
IPM	Integrated Pest Management
CWANA	Central and West Asia and North Africa

PARTICIPANTS

A total of 32 participants representing 16 different countries participated in this masterclass. They were selected based on their CVs to ensure they were suitably qualified and would be able to apply their learnings from the masterclass on their return to their home countries. Please see (attachment 1 and attachment 1a) for more information about the participants.

INSTRUCTORS

A total of 15 experts gave presentations with three key renowned experts from abroad (Dr Timothy Paulitz, USDA-ARS, Pullman, WA; Dr Grant Hollaway, Cereal Plant Pathologist, Australia; and Dr Ian Riley, Nematologist, Australia). For more information about the instructors please see (attachment 2 and attachment 2a).

FUNDING

The following donors are highly acknowledged for their financial support to this course which estimated to cost around 100,000 USD\$:

1. Syngenta
2. CIMMYT
3. MFAL
4. The CRAWFORD Fund
5. ACIAR
6. DikmenFide, Turkey
7. GRDC

PROGRAM

For the full detailed program, please see attachment 3. The program balanced between the theoretical and practical sessions. The participants were also given the chance to present their work from their own institute. They were also given the opportunity to learn how to draft a project proposal on soil borne pathogens topics. Each group consisted of 5 to 6 participants and at the end of the course one of each group presented the proposal and the outcome was significant. The main program activity started at 8 am and ended at around 5 pm on daily basis and after dinner participants were working in groups to prepare for the project proposal.

CERTIFICATE PRESENTATION

At the end of the master class the participants were given a certificate to recognize their completion of the requirements of the course. The director of TZARI Dr Sabri Cakir along with Dr Paulitz, Dr Hollaway, Dr Riley, Dr Dababat and Dr Erginbas-Orakci presented each participant with their certificate. Attachments 4 and attachment 5 are provided as examples of the certificates offered to each participant.

PARTICIPANTS COURSE EVALUATION FORM AND FEEDBACK

At the end of the Master Class the participants were asked to complete a course evaluation related to the course so that improvements to future programs teaching materials for future masterclasses.

The feedback of the participants are presented in Attachment 6 (Tables 1, 2, 3) and was summarized and prepared by Dr Paulitz. Attachment 7 shows the participant Course Evaluation Form.

A quick summary of the feedback from participants revealed that they had learned many new things during the 2-week course and many of them recommend to have this course for a longer period of time but with less presentations and/or lab work per day. They recommended having this kind of course in other countries in the region to benefit more young scientists. They were happy with the course materials and they didn't recommend that anything be left out. They would like to keep in contact with researchers from CIMMYT and other CG centers for future collaboration.

Attachment 1. Course Participants

Participants of the 5th International Master Class on Soil Borne Pathogens of Wheat
held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey.
11–22 July 2016



Australian Government
Australian Centre for
International Agricultural Research



Attachment 1a. Participants list

PARTICIPANTS - Fifth International Master Class on Soilborne Pathogens of Wheat, 11 July - 23rd July 2016

#	Title	NAME	SURNAME	COUNTRY	ORGANIZATION	POSITION	ADDRESS	E-MAIL	PHONE	MOBILE	GENDER
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Attachment 2. Photos of Some Instructors



Abdelfattah DABABAT



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Aziz KARAKAYA



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Mesut KESER



Tim PAULITZ



Ian RILEY



Berna TUNALI

Attachment 2a. Instructors list

PRINCIPAL, GUEST and ASSISTANT INSTRUCTORS - Fifth International Master Class on Soilborne Pathogens of Wheat, 11 July - 23 July 2016

#	Title	NAME	SURNAME	COUNTRY	ORGANIZATION	POSITION	ADDRESS	E-MAIL	PHONE	MOBILE	ROLE
1	Dr	Ian	Riley	AUSTRALIA	Adelaide	Senior Nematologist	Adelaide - Australia	ian.riley@internode.on.net			Principal
2	Dr	Grant	Hollaway	AUSTRALIA	Agriculture Victoria	Senior pathol	Agriculture Victoria, Private Bag 260, Horsham 3401	Grant.Hollaway@depi.vic.gov.au	03 5362 2111		Principal
3	Dr	Amer	Dababat	TURKEY	CIMMYT	Program Leader	P.K. 39 Emek, 06511 Ankara, Turkey	a.dababat@cgiar.org	90 312 344877	905304062825	Principal & Coordination
4	Prof	Timothy	PAULITZ	USA	WSU	Uni Professor	Washington State University, Pullman, WA 99164-6430	paulitz@wsu.edu	509 335-7077		Principal
5	Dr	Gul	Erginbas	Turkey	CIMMYT	Associate Res	P.K. 39 Emek, 06511 Ankara, Turkey	g.erginbas@cgiar.org		5307629560	Expert
6	Ms.	Tessa	Ries	USA	Texas A&M	Graduate Student	2551 W Villa Maria Rd. Apt #447 Bryan, TX 77807 USA	riestessa@tamu.edu	(651)983-5703	(651)983-5703	Guest Expert
7	Dr	Fatih	Ozdemir	TURKEY	TAGEM	Director	Bahri Dagdas International Agricultural Res	fatihozde@hotmail.com	3323551290	5053709635	Guest Expert
8	Dr	Kumerze	Nazari	TURKEY	ICARDA	Senior rust pathol	ICARDA, Izmir	azizkarakaya@hotmail.com		5309776953	Guest Expert
9	Prof	Aziz	Karakaya	TURKEY	Ankara Uni	Uni Professor	Ankara Uni	K.Nazari@cgiar.org	905309776953	0543 5547403	Guest Expert
10	Prof	Berna	Tunali	Turkey	Samsun Uni	Professor Pathol	Faculty of Agriculture	btunali@omu.edu.tr	5336107627	0533 6107627	Guest Expert
11	Prof	Hakan	Ozkan	TURKEY	Uni of Cukurova	Uni Professor	Faculty of Agriculture	hozkan@cu.edu.tr	905325328435	0532 5238435	Guest Expert
12	Dr	Mesut	Keser	TURKEY	ICARDA	Office coordinator in Turkey	ICARDA, Ankara	M.Keser@cgiar.org	905304062823	0505 4032786	Guest Expert
13	Dr	Zafer	Mert	TURKEY	TAGEM	Rust Pathol	TAGEM, Ankara	mert_zufer@yahoo.com	905533513735	0553 3513735	Guest Expert
	Dr	Aziz	Karimov	TURKEY	CIMMYT	Agricultural Economist	P.K. 39 Emek, 06511 Ankara, Turkey	aziz.akmalovich.karimov	+90(312) 344 8777	+90 (551)434 1220	Guest Expert
14	Dr	Yasar	Karaduman	TURKEY	TAGEM	Quality specialist	TAGEM, Eskisehir	yasarkaraduman@hotmail.com	5352775319	2223240300	Expert
15	Dr	Sabri	Cakir	TURKEY	TAGEM	Director - Breeder	TAGEM, Eskisehir	sabricak@hotmail.com	5374026255	2223240300	Director
16	Dr	Suat	Kaymak	TURKEY	TAGEM	Head of Plant health and protection Unit - Pathologist	TAGEM, Ankara	suatkaymak@zmmae.gov.tr		312 344 74 30	Ofital
17	Dr	Yusuf	Aslan	TURKEY	TAGEM	Head, Field Crop	TAGEM, Ankara				Official

Attachment 3. Final program of the 5th International Master Class SBP

Day	Date	Time	Item
SUN	10		Participants arrive and over night in Ankara UTEM.
MON	11	7.30	Breakfast
		8.30	Bus departure from UTEM to Eskisehir
		11.30	Check in at TZARI guesthouse
		12:00	Arrival in Eskisehir. Meet with the Transitional Zone Agri Res Institute Director (Dr. Sabri Cakir)
		12.30-13.30	Lunch
		13.30-14.30	Introduction and breeding activities at TZARI
		14.30-15.30	What is a SBP and how to sample to check for SBP in a wheat field
		15.30-17.00	Sampling for SBP at TZARI (divide into groups and take samples for processing)
		18.30-19.30	Dinner
		19.30-21.00	Slide show by key teaching staff
TUE	12	7.30	Breakfast
		8.30-9.00	Opening, Course outline, Introduction to Staff
		9.00-9.15	Donor Summary
		9.15-9.45	Introduction
		9.45-10.30	Key Features of Soil Borne Pathogens
		10.30-11.00	Morning Tea
		11.00-12.00	Introduction to Soil Borne Pathogens
		12.00-12.30	Participants discussion about Soil Borne Pathogens
		12.30-13.30	Lunch
		13.30-17.30	Practical covering use of microscopes, nematode extraction and isolation of fungi (divide into 2 groups)
		15.30-16.00	Afternoon Tea
		17.30-18.00	Take home message from each trainee exchanged
		18.30-19.30	Dinner
		20.00-21.00	Slide show and presentation by 5 trainees - each trainee 8 min plus 4 min questioning.
WED	13	7.30	Breakfast
		8.30-10.30	Biology / Taxonomy of Fungi
		10.30-11.00	Morning Tea
		11.00-12.30	Crown Rot Biology and Control
		12.30-13.30	Lunch

		13.30-17.30	Laboratory Session: Fusarium
		15.30-16.00	Afternoon Tea
		17.30-18.00	Take home message from each trainee exchanged
		18.30-19.30	Dinner
		20.00-21.30	Slide show and presentation by 5 trainees - each trainee 8 min plus 4 min questioning.
THUR	14	7.30	Breakfast
		8.30-9.30	Genetic of Resistance (mentioning tolerance)
		9.30-10.00	Discussion about Resistance
		10.00-10.45	Introduction to the Turkey-ICARDA Regional Cereal Rust Research Center and regional collaborations of wheat rust diseases
		10.45-11.15	Morning Tea
		11.15-11.45	Breeding for cereal rust resistance
		11.45-12.30	Septoria disease in wheat in Turkey
		12.30-13.30	Lunch
		13.30-14.00	Introduction to molecular technologies
		14.00-15.00	DNA molecular markers and its uses disease resistance in plant breeding with example in wheat - emphasizing RLN/CR & CCN
		15.00-15.30	Afternoon Tea
		15.30-17.00	Greenhouse and Growth Room visit for screening for SBP and visit SBP and other foliar sick plots - Field
		17.00-17.30	Use of molecular tools for identification and quantification of SBP
		17.30-18.00	Introduction of Working Groups on SBPs (teams of 5)
		18.00-18.30	Take home message from each trainee exchanged
		18.30-19.30	Dinner
		20.00-21.00	Slide show and presentation by 5 trainees - each trainee 8 min plus 4 min questioning.
FRI	15	7.30	Breakfast
		8.30-10.30	Biology / Taxonomy of Plant Parasitic Nematodes
		10.30-11.00	Morning Tea
		11.00-12.30	Cereal Cyst Nematode and Root Lesion Nematode
		12.30-13.30	Lunch
		13.30-17.30	Laboratory Session: CCN and RLN (also looking at Nematode extractions from survey samples set up from Tuesday)
		15.30-16.00	Afternoon Tea
		17.30-18.00	Introduction to Research Planning and Project Management for SBP Working Groups
		18.00-19.30	Dinner
SAT	16	7.30	Breakfast
		10.30-12.30	Seed Treatment to control of soil borne diseases at Syngenta

		12.30	Lunch
		12.30-17.30	Sightseeing in Eskisehir
		18.30-19.30	Dinner
SUN	17		
		7.30	Breakfast
		9.00-10.15	Pythium diseases
		10.15-10.45	Morning Tea
		10.45-18.00	Participants presentations (16 presentations)
		13.00-14.00	Lunch
		16.00-16.30	Afternoon Tea
		18.30-19.30	Dinner
MON	18		Breakfast
		8.30-9.30	Eye spot
		9.30-10.30	Take-all and Common Root Rot Biology
		10.30-11.00	Morning Tea
		11.00-12.00	Rhizoctonia
		12.00-12.30	Conservation Agriculture and relationship with Soil Borne Diseases
		12.30-13.30	Lunch
		13.30-17.00	Laboratory Session: Other Fungi (besides Fusarium) / Looking at extractions from previous participant survey samples from previous Tuesday
		15.30-16.00	Afternoon Tea
		17.00-18.30	Working groups on SBP
		18.30-19.30	Dinner
		20.00-21.00	Working groups on SBP
TUE	19	7.30	Breakfast
		8.30-10.30	Population Dynamics and Yield Loss to Nematodes and Crown rot
		10.30-11.00	Morning Tea
		11.00-11.45	Planning Yield Loss Trials for Nematodes and Root Rots
		11.45-12.30	Other Plant Parasitic Nematodes
		12.30-13.30	Lunch
		13.30-15.30	Laboratory Session: Other Plant Parasitic Nematodes
		15.30-16.00	Afternoon Tea
		17.00-17.30	Web access and resources
		17.30-18.00	Writing Scientific publications
		18.30-19.30	Dinner
		20.00-21.00	Working groups on SBP
WED	20	7.30	Breakfast

		8.30-9.15	Current status of wheat root rots in Turkey
		9.15-10.00	Determination of Fusarium species associated with crown rot of wheat in Turkey and assessment of resistance status of some wheat genotypes to Fusarium culmorum
		10.30-11.00	Morning Tea
		11.00-12.00	Importance of Fusarium crown rot pathogens of wheat and barley and control methods
		12.00-12.30	Importance of Social Science
		12.30-13.30	Lunch
		13.30-14.30	Root Biology
		14.30-15.30	Project writing - Discussion
		15.30-16.00	Afternoon Tea
		16.00-18.00	Working groups on SBP
24		18.30-19.30	Dinner
THUR	21	7.30	Breakfast
		8.30-10.00	Visit IWWIP breeding program activities
		10.00-10.30	Morning Tea
		10.30-11.30	IWWIP Breeding Program and integration of Soil Borne Pathogen Resistance
		11.30-12.30	Insect Resistance in Wheat at ICARDA
		12.30-13.30	Lunch
		13.30-15.15	Working groups on SBP presentations (20 min presentation + 5 min discussion per group)
		15.15-15.45	Afternoon Tea
		15.45-17.00	Working groups on SBP presentations (20 min presentation + 5 min discussion per group)
		17.00-18.00	Course Assessment
		18.30-21.30	Final Dinner in Eskisehir
		20.00-21.00	Certificates awarding
FRI	22	8.00	Breakfast
		8.30	Depart to Bursa
		9.00-11.00	Course evaluation
		11.00-12.30	Visiting historical places in Bursa (TBA)
		12.30-13.30	Lunch in Bursa
		13.30-16.00	Visiting historical places in Bursa (TBA)
		16.00-16.30	Return to Eskisehir
		18.30-19.30	Dinner
SAT	23	7.30	Breakfast
		8.30	Participants depart

Attachment 4. Example Certificate 1



International Maize and Wheat Improvement Center (CIMMYT)
Turkish Ministry of Food, Agriculture and Livestock (MFAL)
Syngenta AG
The Crawford Fund
Australian Centre for International Agriculture Research (ACIAR)
Grain Research and Development Corporation (GRDC)

This is to certify that

Dr. Fateh TOUMI

has successfully completed all the requirements of the

**5th INTERNATIONAL MASTER CLASS IN SOIL BORNE PATHOGENS OF WHEAT
11 – 22 July 2016**

held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey.

During the class you had the chance to learn how to;

1. Isolate, extract and identify SBP to properly diagnose their SBP problems
2. Understand the methodologies to scientifically establish the loss of one or several of these SBP
3. Understand the possible control options for the different SBP, with an emphasis on the use of host resistance and other environmentally friendly control methods
4. Understand the principles of incorporating resistance of SBP into an active cereal breeding program.
5. Understand the application of molecular biology both in the identification of the pathogens and the breeding of disease resistant germplasm against the identified SBP
6. Contribute to increased research capacity building in your home organisation and Project writing
7. Further develop your research management, technical and personal skills
8. Establish a regional network of pathologists with key CG pathologists in the region who may work on these SBP.
9. Acquire additional international contacts.

The 5th Master Class in SBP in wheat organizer and coordinator
Dr. Abdelfattah A. DABABAT

Leader, Soil Borne Pathogens Program
CIMMYT, Turkey



Australian Government
Australian Centre for
International Agricultural Research



Attachment 5. Example Certificate 2



International Maize and Wheat Improvement Center (CIMMYT)
Turkish Ministry of Food, Agriculture and Livestock (MFAL)
Syngenta AG
The Crawford Fund
Australian Centre for International Agriculture Research (ACIAR)
Grain Research and Development Corporation (GRDC)

This is to certify that

Mr. Fateh TOUMI

has successfully completed all the requirements of the

**5th INTERNATIONAL MASTER CLASS IN SOIL BORNE PATHOGENS OF WHEAT
11 – 22 July 2016**

held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey.

Dr. Nevzat BIRISIK
Director General
MFAL, Turkey

Dr. Hans-Joachim BRAUN
Director
GWP, CIMMYT

Dr. Dietrich HERMANN
CP R&D Lead Cereals
Syngenta, Switzerland

Dr. Sabri CAKIR
Director
TZARI, Turkey



Australian Government
Australian Centre for
International Agricultural Research



Attachment 6. Course Assessment

Table 1: Course Assessment for section A, what did you think of the course?

In general, I would rate the course as	How well the current course met its objectives	Balance between theory and laboratory work	Balance between different topics	Suitability of teaching methods	Relevance of learning material	Amount of new information	Relevance of course content to your work	Overall length of the course	number of participants	Communication with other participants	Interactions with other participants	Degree of interest generated by course
1	1	1	1	1	2	4	1	5	5	1	1	5
1	1	2	1	1	2	5	2	3	3	1	1	4
1	1	1	1	1	1	5	4	4	3	1	1	4
2	1	1	2	1	2	5	1	4	2	2	2	4
1	1	1	1	1	1	5	1	4	4	1	1	5
1	1	2	1	1	1	3	1	2	2	1	1	4
1	1	1	1	1	1	5	1	3	3	1	1	5
2	1	1	1	1	2	5	2	4	3	1	1	4
1	1	1	2	1	1	4	1	3	3	1	2	5
1	1	1	1	1	1	4	2	2	3	1	3	4
2	1	2	1	1	1	3	1	3	3	1	1	3
2	1	1	1	2	1	4	1	3	3	1	1	5
1	1	2	1	1	1	5	1	3	3	1	2	5
1	1	2	1	2	1	5	3	3	3	1	1	3
1	1	1	1	1	1	3	1	3	3	1	1	5
1	1	1	1	1	1	5	1	5	5	1	1	5
1	1	1	1	2	1	4	2	2	2	2	1	5
2	3	2	2	1	2	4	2	3	3	2	1	3
2	2	3	2	2	2	2	3	3	3	1	1	3
2	2	2	1	2	2	5	3	4	3	1	1	4
1	2	2	1	1	2	4	2	4	4	1	1	5
1	1	1	1	1	2	5	1	4	3	1	2	5
1	2	3	1	2		4	1	5	4	1	2	5
1	1	2	1	1	1	4	1	5	3	1	2	5
1	1	1	1	2	2	4	2	4	3	2	2	5
2	2	1	2	2	1	4	2	3	3	2	2	3
1	2	1	1	1	1	4	1	3	3	1	2	5
2	3	2	1	2	2	3	2	4	4	1	2	4
1.3	1.4	1.5	1.2	1.3	1.4	4.2	1.6	3.5	3.2	1.2	1.4	4.4
1=excellent	1=very well	1= very good	1= very good	1=excellent	1= very good	5= a lot of new information	1= very relevant	5= too long	5= too many	1=excellent	1=excellent	5= a lot of new interest
2=good	2=well	2= satisfactory	2= satisfactory	2=good	2= satisfactory	1= little information	2=relevant	1= too short	1= too few	2=good	2=good	1= no new interest

Table 3: Course Assessment on section F, Logistics and Administration?

Was the accomodation satisfactory	Was the food satisfactory?	Communication course coordinator vs participants	Did you have enough time for self study/relax	How was the overall logistical organization and coordination?
2	2	1	2	2
2	3	1	2	2
	1	1	3	1
1	1	1	2	2
2	1	1	2	1
1	2	1	2	1
1	2	1	1	1
2	2	1	2	2
2	1	1	3	1
2	2	1	3	2
1	2	1	2	1
1	2	1	1	1
1	3	1	3	1
2	1	2	1	1
3	3	1	2	2
1	1	1	1	1
2	2	1	2	2
2	1	1	2	1
2	2	1	2	2
5	2	1	3	3
2	2	1	3	1
2	2	1	3	2
2	2	1	2	2
2	2	1	2	2
1	1	1	2	1
1	1	1	1	1
1	1	1	2	1
2	2	2	2	2
1.8	1.8	1.1	2.1	1.5
1= excellent	1= excellent	1= excellent	1= more than needed	1= excellent
2= good	2= good	2= good	2= just enough	2= good
			3= not enough	

Attachment 7. Participants Course Evaluation Form

**The 5th International Training Course of
Soil Borne Pathogens of Wheat
11 – 22 July, 2016 Eskisehir**

Held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey in collaboration
with the International Maize and Wheat Improvement Center ((CIMMYT)

***Your help in completing this questionnaire is appreciated. The information
that you provide will be useful in planning future events like this and will help
course organizers improve their materials and presentations.***

Name (not obligatory): _____
Current Employer: _____
Position: _____
Postal Address: _____
Email:
Phone (land line):
Phone (cep/mobile):
Fax:
Did you ever participate in a course similar to this ?
<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, could you please name country and organization / course topic:

A. What did you think of the course?

In general, I would rate the course as: Excellent Good Average Poor Very poor

How well the course met its objectives: Very well Well Satisfactory Not well Not at all

Balance between theory and laboratory work: Very good Satisfactory Unsatisfactory

Balance between different topics: Very good Satisfactory Unsatisfactory

Suitability of teaching methods used (e.g. lectures, demonstrations, practical exercises, field visits, discussions, etc.):
 Excellent Good Average Poor Not Suitable

Relevance of provided learning materials and books: Very good Satisfactory Unsatisfactory

Amount of new information provided during course (a lot of new inf.) 5 4 3 2 1 (little new inf.)

Relevance of course content to your work/institution: Very relevant Relevant Somehow Irrelevant

Overall length of course in relation to content: (too long) 5 4 3 2 1 (too short)

Number of participants: (too many) 5 4 3 2 1 (too few)

Communication: scientists vs. participants Excellent Good Average Poor Very Poor

Interactions with other participants: Excellent Good Average Poor Very Poor

Degree of interest generated by course: (a lot of new interest) 5 4 3 2 1 (no new interest)

What do you think is the most important thing you have learned from the Class?

What were the two most important aspects of the Class activities for you? (please underline)

- Lectures
- Laboratory sessions
- Discussion groups
- Field work
- Preparation of Case Studies
- Meeting with other scientists with similar interests
- Something other than the above – give details

B. What other topics should be added?

C. What topics should be left out?

D. Impact

Do you feel confident enough to share what you have learned with peers in your country? Yes No

Following this course, are you willing to take the role of resource person in future in-country courses? Yes No

Will you be able to use new knowledge and skills at your work (at current institution)? Yes No

If not, what are the constraints?

Would you recommend a course like this to other people? Yes No

Why yes/not? _____

What type of further interaction with CIMMYT, ICARDA, INRAT Scientists, Australian/US teaching staff do you expect/prefer?

Science –

Training –

Did you have any language problems? If so, please give details.

What should be done now to reinforce the activities of this Class?

E. Strengths & weaknesses

Please list what you consider to be 3 strengths and 3 weaknesses of the course

Strengths – most useful aspects of course

1.
2.
3.

Weaknesses – least useful aspects of course

1.
2.
3.

F. Logistics and administration

Was the accommodation satisfactory? Excellent Good Average Poor Very poor

Was the food satisfactory? Excellent Good Average Poor Very poor

Communication- course coordinator vs. participants: Excellent Good Average Poor Very Poor

Did you have enough time for self study / relax? More than needed Just Enough Not enough

How was the overall logistical organization and coordination? Excellent Good Average Poor Very poor

G. Additional Comments

Please write any comments or suggestions you may have

What to improve/change; what would be more relevant for your country/institution; etc

Many thanks for taking the time to fill out this survey

*Dr Abdelfattah DABABAT
Course Coordinator
Leader, Soil Borne Wheat Scientist, CIMMYT*

PHOTOS FROM THE COURSE

5th INTERNATIONAL MASTER CLASS ON SOIL BORNE PATHOGENS OF WHEAT
11 – 22 July 2016
held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey.



Picture 1. CIMMYT's course organizers with key international teaching staff with delegates from the Turkish Ministry of Food, Agriculture and Livestock and senior managements from the TZARI.

5th INTERNATIONAL MASTER CLASS ON SOIL BORNE PATHOGENS OF WHEAT

11 – 22 July 2016

held at Transitional Zone Agricultural Research Institute, Eskisehir, Turkey.



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Picture 2. Participants of the 5th Master Class on SBP of Wheat welcomed by the MFAL delegates and the TZARI's director and Prof. Dr. Ali Koc (Dean of agriculture faculty of Eskisehir Osmangazi University) during the opening ceremony.

5th INTERNATIONAL MASTER CLASS ON SOIL BORNE PATHOGENS OF WHEAT

11 – 22 July 2016

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Picture 3. Participants visiting the IWWIP breeding program at TZARI field station in Eskisehir.

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Picture 4. Participants visiting the greenhouses activities at TZARI field station in Eskisehir.

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Picture 5. Participants visiting the SBP sick plots trials at TZARI field station in Eskisehir.



Picture 6. Prof Paulitz is explaining about smut diseases at the national field diseases trials at TZARI field station in Eskisehir.



Picture 7. Dr Gul Erginbas Orakci is demonstrating about nematodes extraction in a laboratory session at TZARI, Eskisehir



Picture 8. Dr Dababat shows the cyst of *Heterodera filipjevi* on the root systems at the SBP sick plot at TZARI field station in Eskisehir.



Picture 9. Dr Holloway explains how to score against the root rot caused by *Fusarium culmorum* on the wheat stem



Picture 10. Dr Dababat presenting the SBP sick plots trials at the TZARI field station, Eskisehir.



Picture 11. Dr Keser (ICARDA's wheat breeder and office coordinator in Turkey) explaining the IWWIP breeding program at the TZARI field station, Eskisehir.



Picture 12. Dr Erginbas-Orakci is explaining about the seed treatments trials against the root lesion nematodes in the greenhouse.



Picture 13. Participants at the SBP sick plots trials at the TZARI field station, Eskisehir



Picture 14. Some key instructors with some participants in the lab session at TZARI, Eskisehir.



Picture 15. Participants at the lunch (Iskender famous dish) in Bursa, Turkey.