

FINAL REPORT

**THIRD INTERNATIONAL MASTER CLASS
ON
SOILBORNE PATHOGENS OF WHEAT**

INRAT Tunis, TUNISIA

28 April – 9 May 2008

Prepared by Dr Julie M Nicol

CIMMYT Soil Borne Wheat Pathologist Turkey

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Introduction

This 3rd International Master Class on Soil Borne Pathogens of Wheat was conceived at two previous Master Classes held on the same subject in Turkey in 2003 and in China in 2005. The Turkey class focussed principally on countries within West Asia, and the China Class was country specific. North Africa is another major wheat producing region, where rainfed agriculture, is dominated by cereals and terminal drought stress. To date there are limited published reports on the importance of SBPs in North Africa, however the few that are published clearly state that they are important. Furthermore, it is acknowledged that the research capacity and regional framework to address these deficiencies is limited.

The aim of the 3rd International Soil Borne Pathogens of Wheat Master Class was to provide training to cereal pathologists working in a region (principally on North Africa, but including some participants from West Asia) where soil borne pathogens (SBP) are likely to be a serious constraint to yield. This region has a Mediterranean climate and thus similar in many respects to Southern Australia.

The Class is designed, through a series of modules, to enhance the participants' ability to understand the biology, pathology and control of important pathogenic nematodes and root rotting fungi of cereals.

- Isolate, extract and identify SBP to properly diagnose potential problems.
- Understand the methodologies to scientifically establish losses caused by one or more of these SBP.
- Understand the possible control options for the different SBP, with an emphasis on the use of host resistance and crop rotation.
- Understand the principles of incorporating resistance to SBP into an active cereal breeding program.
- Understand the application of molecular biology in the breeding of disease resistant germplasm and identification of pathogens.
- Contribute to increasing research capacity in the different countries.
- Further develop participant's research management and technical skills.
- Establish a regional network of pathologists in the region who may work with the CG centres on these SBP.
- Acquire additional international contacts.

A specific issue that was addressed was the important future role of conservation agriculture and its impact possible on SBP in the region.

Participants

The present Master Class was organised with participants particularly from North Africa and also parts of West Asia. Twenty trainees came from 9 countries including Tunisia (5), Algeria (3), Morocco (2), Libya (2), Syria (2),

Iran (1), Kazakhstan (1) and Australia (2). The ages of the participants varied greatly from PhD students to long term career scientists, and eight of them were female. Many of the participants were specifically trained in aspects of Plant Pathology and most were representatives from the Ministries of Agriculture from their representative countries. A list of participants is given in Attachment 1, and their photos in Attachment 2 (along with local assisting staff) and Attachment 4.

Administration

The Class was held in Tunis at the Tunisian Agricultural Research National Institute (INRAT: Institut National de la Recherche Agronomique de Tunisie) under the Ministry of Agricultural and Water Resources. Special thanks are extended to Dr Amor Chermiti, Director General of INRAT who hosted the course for the region. The course was coordinated by Julie Nicol under the aegis of ICWIP (ICARDA CIMMYT Wheat Improvement Program) and specifically by the International Maize and Wheat Improvement Center (CIMMYT International), Turkey Office.

One of the major advantages of this course was that two of the local INRAT scientists (Dr Samia Gargouri and Dr Najoua Kachouri) visited Turkey in the 2007 season to work with Dr Nicol to plan carefully the field related components of the course, such as yield loss and resistance screening for SBP. These trials were well designed and executed in collaboration with the local durum breeder (Dr Gharbi Mohamed Salah) and gave the participants an excellent insight into how to work with these pathogens under field conditions. Special thanks should be given to head of the Phytopathology Laboratory Dr Hajlaoui Mohamed Rabeh and his staff (Photos in Attachment 2) for making the laboratory practicals feasible especially with such a large group.

The key organiser of the Master Class was Dr Julie Nicol, Senior Soil Borne Wheat Pathologist, based in the CIMMYT regional office in Turkey. As with the former Turkey Master Class the program was planned by Dr Nicol in consultation with the Australian lecturing staff, the key local Tunisian organising committee and Dr Paul Ferrar, Director of the Crawford Fund Master Class Program.

Special thanks are given to local office coordination staff in the CIMMYT and ICARDA Office in Turkey (Ms Seher Turkyilmaz CIMMYT and Ms Isin Kusmenoglu ICARDA) and ICARDA Tunis Office (Dr El Mourid – Regional ICARDA coordinator for North Africa, Ms Radhia Ben Amor– secretary and Ms Khadija Mediouni, accountant).

Local arrangements in Tunisia were managed by both INRAT, ICARDA Tunis and Dr Nicol.

One of the challenges with the course was the teaching venue and the hotel accommodation. The choice of the hotel was excellent as a competitive price was offered for the 4 star hotel El Mouradi Gammarth, which was 20 minutes from the INRAT headquarters in Ariana (downtown Tunis). Teaching staff and

participants alike were pleased to have the comfortable venue to return to in the evenings away from the city. INRAT supplied all local transport; however this required extra travel time (40 minutes per day). INRAT provided very good lecturing facilities and laboratory teaching laboratories, which was not an easy task to achieve considering it is a research facility instead of a teaching laboratory. The last 2 days of the course were held only at the hotel where excellent meeting rooms were available for the consolidation and discussion of information.

Instructors

The key teaching experts including both National and International are given in Attachment 3 and included 3 local INRAT scientists, 3 Australian, 1 French and 4 ICWIP scientists (ICARDA CIMMYT Wheat Improvement Program Scientists). They are shown in Attachment 3 and photo in Attachment 4.

The three Australians (Prof. Lester Burgess, Dr Ian T Riley and Dr Hugh Wallwork) are the same team which have been involved in the 2003 and 2005 Master Classes. Their experience, professionalism and clear contributions ensured this Class like the others was extremely successful.

The three local INRAT contributors provided an excellent insight and base for the course with respect to Fusarium, Cereal Cyst Nematode and Wheat Breeding in Tunisia. As mentioned previously their efforts to establish appropriate trials tailor-made for the course were highly beneficial and appreciated.

We were fortunate to have Dr Roger Rivoal join the course (retired nematologist from INRA France), who has worked extensively with North Africa during his career. His discussions with the participants were very positive and fruitful.

From ICWIP Dr Amor Yahyaoui (Coordinator of the ICARDA CIMMYT Wheat Improvement Program) joined the opening of the course and also gave an overview of the importance of SBP in the region and the CGIAR network. ICWIP Bread and Durum Wheat Breeders from CIMMYT Mexico were also able to attend for a day and they provided further insights into the problems of SBP and the International strategies in place to start addressing these issues. Dr Nicol also gave local experiences of key SBP and how these are currently being addressed within the CGIAR and several National Programs.

Funding

The ATSE Crawford Fund provided a grant from central (Master Class) funds and from the South Australian branch. CIMMYT also provided support, both directly as cash and in providing the time of its staff to help with the organisation. ICARDA likewise provided cash and the time of its Tunis staff in local organisation. The Kirkhouse Trust (UK-based) also provided generous cash for the travel of teaching staff, and the University of Sydney and the South Australian Research and Development Institute (SARDI) provided in-kind support through provision of teaching staff.

Budget sources	US\$
ATSE Crawford Fund	33,500
ATSE Crawford Fund SA Branch	10,000
The Kirkhouse Trust – UK	10,000
CIMMYT International	5,000
ICARDA	8,000
IARC – USAID (Kazak)	3,320
INRAT	in kind
ICWIP – ICARDA CIMMYT Wheat Improvement Program	in kind
TOTAL	69,820

Funds were also found for two young PhD students from Australia (Mr Noel Knight from University of South Queensland and Mr Phillip Davies from the University of Sydney) to attend the Master Class, following the similar success of participation of young Australians in other Master Classes. It was clear that they both gained a tremendous amount of knowledge and experience from the class in addition to being helpful in the preparation of practicals and also teaching in some of the laboratory sessions.

Program

Full details of all lectures, practical classes and teachers are shown in the Program in Attachment 3. As with the other two Master Classes conducted in both Turkey and China there was a combination of lectures, interactive practicals, field trips and general discussion throughout.

It became clear from the field trips and specifically from the cereal cyst nematode yield loss trial that SBP are widespread in Tunisia, and most likely in other regions of North Africa, especially under drought stressed conditions. The limited rotational options and extensive durum wheat cultivation favours diseases such as take-all, crown rot, eyespot and cereal nematodes (both cyst and root lesion nematodes). The importance of a shift to the use of conservation agriculture (CA) technologies was discussed many times. Problems arise however with the lack of sufficient rotation crops, the requirement for grazing of livestock. Future problems association with CA agriculture were highlighted especially with increased crown rot inoculum and the possible rise of *Rhizoctonia solani* as a problem.

As with other Master Classes, the participants were asked to give specific presentations of their local situation. This helped to illustrate the distribution of the SBP pathogens across the region.

One of the major exercises which was again successfully achieved in this Master Class was the last two days of consolidation and dividing the group into three to work on specific case studies for a research theme and devise a clear strategy of how to work on a scientific issue of regional importance. The three case studies which were put forward were;

- Control of Cereal Nematodes in North Africa
- Control of Soil Borne Pathogens in West Asia
- The opportunities and limitations of Conservation Agriculture in North Africa with Soil Borne Pathogens.

All groups worked very hard on consolidating information gathered over the duration of the course and their local experiences.

Publications

As with the other two previous Master Classes efforts were made here to ensure that adequate training material was provided which included;

- A CD of the course presentations, photos and contact details was provided at the end of the course to each participant.
- A CD prepared by CIMMYT covering most important CIMMYT published plant pathology texts, as well as key scanned articles of importance for various SBPs. In total more than 50 publications were copied onto the CD.
- Draft version of the revised 'Theoretical Training Manual for Soil Borne Pathogens of Wheat' edited by JM Nicol, AR Bentley and PJ Ferrar and addition to the draft accompanying 'Practical Training Manual for Soil Borne Pathogens of Wheat'. These are presently being updated and revised and are planned to be published by ACIAR later this year.
- Published books:
 - Cereal root and crown diseases. Wallwork H. 2000. GRDC Publications, Kingston, Canberra, Australia, ISBN: 1-875477-80-2. pp 58.
 - Common diseases of small grain cereals – A guide to identification. Zillinsky, F.J. 1983. Centro Internacional de Mejoramiento de Maiz y Trigo. pp 141.
 - Seed testing of maize and wheat – a Laboratory Guide. Edited by Warham E.J., Butler L.D. and Sutton B.C. CIMMYT and CAB International. ISBN: 968-6923-70-5. pp 84.
 - Diagnostic manual for plant diseases in Vietnam. Burgess L.W., Knight T.E., Tesoriero, L. and Phan, H.T. 2008. ACIAR, Canberra. ISBN 978 1 921434 18 1 pp 210.

Certificate Presentation

As with other Master Classes certificates were presented at the closing ceremony. For this purpose Dr Richard Brettell (ICARDA Director Integrated Gene Management Program) attended and presented along with Dr Amor Chermiti (Director General INRAT) at the closing dinner.

Participant Feedback

Feedback was sought from participants by circulating a SBP course evaluation form which was returned at the end of the course (Attachment 6). This form was a combination of The ATSE Crawford Fund, CIMMYT and ICARDA evaluation forms. This confirmed the value of the course and provided some indications for planning of future Masterclasses. The key summary of the responses are as follows:

Twenty questionnaires were handed out and 18 returned. One was anonymous.

Question	Response
In general how would you rate the course	Excellent 8, Good 9, Average 1
How well the course met its objectives	Very well 7, Well 9, Somehow 2
Balance between theory and laboratory work	Very good 10, Satisfactory 3.5, Unsatisfactory 2.5
Balance between different topics	Very good 11, Satisfactory 7
Suitability of teaching methods	Excellent 10, Good 7 Average 1
Relevance of learning materials provided	Very good 14, Satisfactory 4
Amount of new information provided during the course	4.3 on scale of 5
Relevance of course content to your work/institution	Very relevant 9, Relevant 9
Overall length of course in relation to content	Just right
Number of participants	Mostly just right, 4 said too many
Communication: scientist vs. participants	Excellent 9, Good 6, Average 3
Interactions with other participants	Excellent 10, Good 5, Average 3
Degree of interest generated by the course	4.4 on scale of 5
What do you think is the most important thing you have learned from the class?	Conservation agriculture (3), <i>Fusarium</i> (3), Culturing (2), Collaboration (2)
What were the two most important aspects of the Class activities for you?	Lectures (11), Fieldwork (7), Laboratory sessions (6), Meeting with other scientists (5), Discussion groups (2), Case studies (1)
What other topics should be added	More lab work (3), Internet (2) various other single responses
What topics should be left out	Only two responses came in – Field methods and some lectures

Question	Response
Strengths – most useful aspects of the course (List 3)	Lectures (8), Practicals (7), Field trips (6), Teaching staff (5), Communications (4), New knowledge (3), Resistance (2), Contacts (2)
Weaknesses – least useful aspects of the course (List 3)	Time delays/problems (6), Language (5), Molecular (2), Field trips (2)
Do you feel confident enough to share what you have learned with peers in your country?	Yes 15, No 1
Following this course, are you willing to take role of resource person in future in-country courses?	Yes 16, No 0
Was the accommodation satisfactory?	Excellent 10, Good 5, Average 3
Was the food satisfactory?	Excellent 8, Good 6.5, Average 3.5
Communication- course coordinator vs. participants:	Excellent 13, Good 5
Did you have enough time to study/relax?	More than needed 1, Just enough 8, Not enough 7
How was the overall logistical organisation and coordination?	Excellent 6, Good 10, Average 1

Conclusions from the course evaluation questionnaires:

- The participants of the course overall were extremely pleased with the course.
- It is clear that language was a barrier for some and this limited the potential learning experience.
- Most of the participants plan to use this knowledge on return to their home countries.

Future Action

It became very clear during the course that the groups were very keen to establish and form regional networks of importance with specific SBP. This included a North African Cereal Cyst Nematode Network (Attachment 7). A similar network was also proposed for working on crown rot in the region.

After completion of the course the local INRAT committee met with Prof Lester Burgess and Dr Nicol and several suggestions were made on how to move the work forward given the knowledge and networks generated (see Attachment 8).

Dr Nicol extends her thanks especially to The ATSE Crawford Fund for their continued support for SBP of Wheat in the region of West Asia, North Africa and China. Thanks also are given to University of Sydney and SARDI for enabling

the key Australian teaching staff to also participate in the course, as with the Master Classes in Turkey and China.

It can be clearly stated that significant knowledge has been transferred and the building blocks of regional and bilateral collaboration have been put in place to enable these important pathogens to be included in the biotic constraints to marginal wheat production systems.

Thanks are extended to the Australian teaching staff (Dr Hugh Wallwork, Dr Ian Riley and Prof. Lester Burgess) for their time and assistance with the preparation of this report.

Dr Julie M. Nicol
Course Coordinator
CIMMYT Senior Soil Borne Pathologist
Turkey Office
May 2008

Attachment 1 - List of Participants

PARTICIPANTS - Third International Training Course Soil Borne Pathogens on Wheat, 28 April - 9 May 2008

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GENDER	TITLE	FIRST NAME	SURNAME	COUNTRY	ORGANISATION	POSITION	ADDRESS	EMAIL	PHONE	MOBILE	FAX								
F	Mrs	Hatida	KHECHACHE	ALGERIA	INRAA EL HARRACH, Alger, Alger	Pathologist	Ubp. 37 CRP MAHDI Boualem, BARAKI- Alger- Algerie	khechachehatida@yahoo.fr	778368887	778368887									
M	Mr	Aissa	MOKABLI	ALGERIA	INA EL HARRACH, Alger, Alger	Nematologist	département de Zoologie Agricole et Forestière, Institut National Agronomique d'El Harrach, Alger, Algérie	mokaissa@yahoo.fr	771991385	0771 991385									
F	Mr	Tassadit	SID OTMANE	ALGERIA	INRAA ST TE Station INRF Tamansasset	Geneticist	station INRF, Tamansasset, ALGERIE	t_sidotmane@yahoo.fr	29343939	772255311	29342498								
M	Mr	Phillip	DAVIES	AUSTRALIA	UNIVERSITY of SYDNEY, PLANT BREEDING INSTITUTE	PHD Student	PMB 11, CANDEN, WSW 2570, Australia	p.davies@usyd.edu.au	+61403613974	+61293518800									
M	Mr	Noel	KNIGHT	AUSTRALIA	University of Southern Queensland	PHD Student	center for system biology, university of southern queenzland, west ST. Toowoomba	knighnt@usq.edu.au Fung/6@hotmail.com		427157523									
M	Dr	Majid	HASHEMIN	IRAN	Research Staff of Cereal Pathology Unit, Cereal Research Department, Seed & Plant Improvement Institute (SPII), Mard Abad Road, P.O.Box 4119, Karaj, Iran	Cereal Pathologist	Cereal Pathology Unit, Cereal Research Department, Seed & Plant Improvement Institute (SPII), Mard Abad Road, P.O.Box 4119, Karaj 31585, Iran	ma_ha1354@yahoo.com	+982616702914	+989122148701	+98216702698								
F	Ms	Zhanar	TAKIYEVA	KAZACKSTAN	Kazakh Research Institute of Plant Protection	Plant Pathologist		a_sagitov@mail.ru		7(7272)295609									
M	Mr	Mohamed Muftah Emhadi	ELHAMAR	LIBYA	Agricultural Research Centre of Libya, Benghazi Research Station	Agricultural Scientists		MOHMA-ALI2000	925388832	925388832									
M	Mr	Mustaf Ouman	E'LLAUS	LIBYA	Agricultural Research Centre of Libya, Tripoli	Nematologist	Tripoli- Libia. ARC.	alouism@yahoo.uk	218925665176	9256665176									
M	Mr	Fouad	MOKRANI	MOROCCO	INRA	Nematologist, Cereal	INRA- CRRR Kenitra Maroc	fouad_iav@yahoo.fr zara_fouad@hotmail.com	21261754620	21261754620									
M	Mr	Abdelhamid	RAMDANI	MOROCCO	INRA	Cereal Pathologist,	INRA- CRRR Meknes Maroc BP. 578	ramhamid5@gmail.com ramhamid@hotmail.com	21260967529	21260967529	21235300244								
F	Ms	Safieh	AL-MASRI ARFH	SYRIA	GOSAR-Plant Protection	Cereal Pathologist - Agricultural Engineer	General Comission of Scientific Agricultural Research, SBPS? Damascus, Syria	safiamasri@gmail.com	+963999536273	09955 36273									
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F	Miss	Azza	RHAIEM	TUNISIA	INAT(laboratory of plant pathology)	Phytopathologist	43 AV/Ghates Nicolle, 1082, tunis, Tunisia	azza_th@yahoo.fr	21622067472	21698693203									
F	Mrs	Ben	YOUSSEF NOURA	TUNISIA	INRAT TUNIS	Phytopathologist	Ruetiedi Karray 1080 Aviana, Tunisia	noura.moni@gmail.com	21671230024	21697465629	21671231509								
M	Mr	Durmus	ERDURMUS	TURKEY	PPCRI Plant Protection Central Institute	Cereal Pathologist		erdurmus@hotmail.com	+903123445994	+905367829420	+903123151531								
F	Ms	Gül	ERGINBAŞ ORAKCI	TURKEY	CIMMYT	Root Rot Specialist	Karabayir baglari, Ziraat cad. Anadolu Tasismal Arastirma Enstitusu, Eskisehir, Turkey.	gul_erginbas@hotmail.com	902223240300	905333555885									

Attachment 2 - Photographs of Participants and Local Assistants



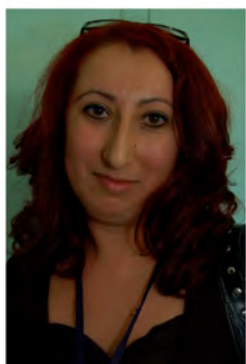
Abdelhamid Ramdani (Morocco)



Aissa Mokabli (Algeria)



Aman Mulki (Syria)



Azza Rhaiem (Tunisia)



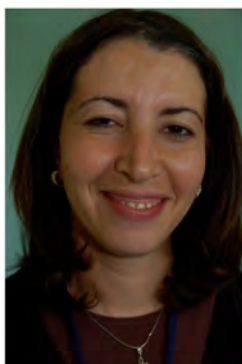
Durmus Erdurmus (Turkey)



Fouad Mokrani (Morocco)



Gul Erginbas Orakci (Turkey)



Hafida Khechache (Algeria)



Hajlaoui Mohamed Rabeh (Tunisia)



Kammoun Lobna (Tunisia)



M. Muftah Emhadi Elhamar (Libya)



Majid Hashemi (Iran)

Attachment 2 - Photographs of Participants and Local Assistants



Mustafa Omarn E'llaus (Libya)



Najoua Kachouri (Tunisia)



Noel Knight (Australia)



Noura Omri Benyoussef (Tunisia)



Philip Davies (Australia)



Safieh Al-Masri Arfh (Syria)



Samia Berrau (Tunisia)



Samia Gargouri (Tunisia)



Somia Chehimi (Tunisia)



Sonia Mansouri (Tunisia)



Tassadi Sid Otmane (Algeria)



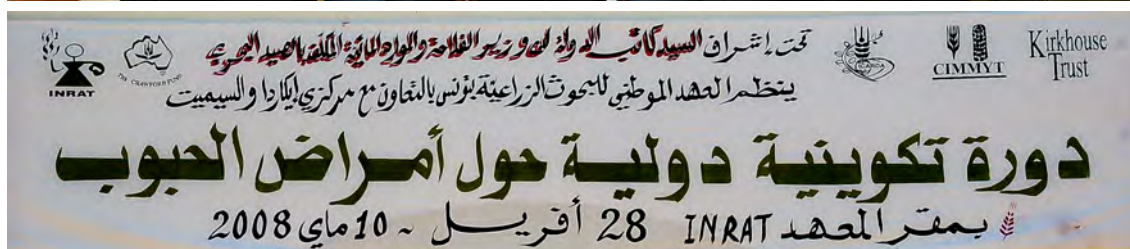
Zhana Takiyeva (Kazakhstan)

Attachment 3 - Key National and International Instructors

KEY NATIONAL AND INTERNATIONAL INSTRUCTORS - 3rd International Training Course Soil Borne Pathogens on Wheat, 28 April - 9 May 2008

GENDER	TITLE	FIRST NAME	SURNAME	COUNTRY	ORGANISATION	POSITION	ADDRESS	EMAIL	PHONE	MOBILE	FAX
M	Dr	Gharbi Mohamed	SALAH	TUNISIA	INRAT	DW Breeder	Laboratoire de protection Vegetaux, INRAT, Rueitedi Karray 2049 Tunisia	gharbi.medsalah@iresa.agrinet.tn	2169433624		
M	Dr	Samia	GARGOURI	TUNISIA	INRAT	Root Rot Specialist	Laboratoire de protection Vegetaux, INRAT, Rueitedi Karray 2049 Tunisia	sgargouri@yahoo.com kamoun.samira@iresa.agrinet.tn	2169433624	21697433624	
M	Dr	Najoua	KACHOURI	TUNISIA	INRAT	Nematologist	Laboratoire de protection Vegetaux, INRAT, Ariana, 2049 Tunisia	n-najoua@yahoo.fr	21671230024	21698468660	21671235317
M	Prof.	Lester	BURGESS	AUSTRALIA	FACULTY of AGRICULTURE, FOOD & NATURAL RESOURCES	Honorary Professor	University of Sydney, 2006, Sydney, Australia	L.Burgess@usyd.edu.au	+61293512526		+61295312945
M	Dr	Ian	RILEY	AUSTRALIA	SARDI / University of Adelaide	Ag Scientist	Plant Research Centre, Hartley Grove, Urrbrae South Australia 5064	riley.ian@saugov.sa.gov.au ian.riley@adelaide.edu.au	+61883039481	+61421098961	+61883039393
M	Dr	Hugh	WALLWORK	AUSTRALIA	SARDI	Leader, Wheat & Barley Improvement	Plant Research Centre, Hartley Grove, Urrbrae South Australia 5064	wallwork.hugh@saugov.sa.gov.au	+61883039393		+61882720607
M	Dr	Roger	RIVOAL	FRANCE	Formerly INRA Renne (now retired?)	Cereal Nematologist		Roger.Rivoal@rennes.inra.fr rogerivo@numericable.fr			
M	Dr	Yann	MANES	FRENCH	CIMMYT	Spring Wheat Breeder	Apdo Postal 6-641, Mexico DF, MEXICO	y.manes@cgiar.org			
M	Dr	Amor	YAHYAOUJ	TUNISIAN	ICWIP	ICWIP - ICARDA CIMMYT Wheat Improvement Program Coordinator		a.yahyaoui@cgiar.org			
F	Dr	Julie	NICOL	TURKEY	CIMMYT	Soil Borne Pathogen Wheat Scientist	P.K. 39 Enekk 06511 Ankara TURKEY	j.nicol@cgiar.org	+903123448777		+903123270798
M	Dr	Karim	AMMAR	TUNISIAN	CIMMYT	Spring Durum Wheat Breeder	Apdo Postal 6-641, Mexico DF, MEXICO	k.amar@cgiar.org			

Attachment 4 - Selected Photographs



**Participants of the 3rd International Master Class of Soil Borne Pathogens
of Wheat
28 April – 9 May 2008 Tunisia
(full names are supplied in Attachment 2)**

Attachment 4 - Selected Photographs



National and International Teaching Experts of the 3rd International Master Class of Soil Borne Pathogens of Wheat 28 April – 9 May 2008 Tunisia

Backrow left-right Dr Samia Gargouri (INRAT Tunisia), Prof Lester Burgess (University of Sydney, Australia), Dr Hugh Wallwork (SARDI, Australia).

Front row left-right Dr Gharbi Mohamed Salah (INRAT Tunisia), Dr Julie Nicol (CIMMYT Turkey), Dr Najoua Kachouri (INRAT Tunisia), Dr Ian T Riley (SARDI, Australia) and Dr Roger Rivoal (retired INRA, France).



Professor Lester Burgess explaining isolation procedures for root rotting fungi to participants in laboratory class.

Attachment 4 - Selected Photographs



A field demonstration on the losses caused by cereal cyst nematode (left side nematode controlled with Temik nematicide and right side (no control). The trial was planted by INRAT Scientists (Dr Kachouri and Dr Salah) especially for the course and showed significant yield losses on commonly cultivated durum wheat Karim, especially under severe drought conditions.



Participants of the SBP course of wheat discussing screening methods for root rotting fungi under natural field conditions

Attachment 5 - Program

Final program: Third International Master Class Soil Borne Pathogens of Wheat

INRAT, Tunisia, TUNIS. 27 April - 10 May 2008

Month	Day	Date	Time	Activity	Location
	Saturday	26	time	Arrival of participants	lecture/lab
April	Sunday	27	9.30am	9.30am meet in reception of the hotel for Field Trip to Mateur to collect diseased plant and soil samples for the course with plan to return to hotel by 5.30pm	field
	Sunday	27	7pm	Departure from hotel for welcome dinner	
April	Monday	28	8.30am	Departure from hotel	
	Monday	28	9am-1pm	Opening Ceremony	lecture
	Monday		1pm-2.30pm	LUNCH AT INRAT - sandwiches and fruit	lecture
	Monday	28	2.30pm-3.30pm	Introduction to SBP - Root Rot and Nematodes	lecture
	Monday	28	3.30pm-4pm	Coffee in lecture theatre	lecture theatre
	Monday	28	4pm-6.30pm	Isolate Fungi from Sunday - divide into 2 groups	lab
	Monday	28	6.30pm	Departure to hotel from lab	lab
				Free evening	
April	Tuesday	29	7.00am	Departure from hotel	
	Tuesday	29	7.30am-9.30am	Biology and Taxonomy of Crown Rot (CR) and Control, Fusarium Head Scab (FHS) and its relation to CR. Phil Davies student presentation (Australia).	lecture
	Tuesday	29	9.30am-10.00am	Coffee in lecture theatre	lecture
	Tuesday	29	10.00am-11.00am	Importance of Root Rots in WANA region : Dr Amor Yahyaoui ICARDA	lecture
	Tuesday	29	11.00am-12.30pm	Biology and Taxonomy of PPN	lecture
	Tuesday	29	12.30am-2pm	LUNCH AT RESTAURANT - Pizza, Icecream, fruit and drink	
	Tuesday	29	2.00-4.00pm	Nematode practical - GROUP A - Fenwick Can (CCN), GROUP B - look at CCN, possibly stain roots from Greenhouse	lab
	Tuesday	29	4.00pm-4.30pm	Coffee in lecture theatre	lecture theatre
	Tuesday	29	4.30pm-6.00pm	5 presentations at the end of day - Gul Erginbas (Turkey), Majid Hashemin (Iran), Noel Knight (Australia), Kammoun Lobna (Tunisia), Tassadit sid Otmane (Algeria)	lecture theatre
	Tuesday	29	6.00pm	Departure to hotel from lecture theatre	lecture theatre
	Tuesday	29	8.00pm	DINNER IN HOTEL EI Mouradi	
April	Wednesday	30	7.00am	Departure from hotel	
	Wednesday	30	7.30am-9.30am	Cereal Cyst Nematode Biology and Control	lecture
	Wednesday	30	9.30am-10.00am	Coffee in lecture theatre	lecture
	Wednesday	30	10.00am-12.15pm	Root Lesion Nematode - Biology and Control	lecture
	Wednesday	30	12.30am-2pm	LUNCH AT INRAT - half sandwiches, half salad, fruit	
	Wednesday	30	2.00 - 3.15pm	Split into two groups - GROUP A - Root Lesion Nematode and preparation of carrot cultures. GROUP B - Examine fungal isolation plates from Monday.	lab
	Wednesday	30	3.15 - 3.45pm	Coffee break in lab	lab
	Wednesday	30	3.45 - 5.30pm	Rotation of Group A and B	lab
	Wednesday	30	5.30-6.30pm	Cereal Breeding in Tunisia - achievements and future prospects. Dr Gharbi Mohamed Salah - INRAT DW Breeder	lecture theatre
	Wednesday	30	6.30pm	Departure to hotel from lab	lecture theatre
	Wednesday	30		free evening	
May	Thursday	1	7.00am	Departure from hotel for field trip	
	Thursday	1		Field Trip - Béjà (wheat breeding program) and oued Miz to visit Root Rot Trials	Field
	Thursday	1		Free evening	
May	Friday	2	9.00am	Departure from hotel	
	Friday	2	9.30am-12.30am	Introduction to the less common fungi: Common Root Rot, Take- All Eyespot and Rhizoctonia	lecture theatre
	Friday	2	11.00-11.30am	Coffee in lecture theatre	lecture theatre
	Friday	2	11.30 - 12.30am	Introduction to the less common fungi: Common Root Rot,Take-All, Eyespot and Rhizoctonia (cont)	lecture theatre
	Friday	2	12.30am-2pm	LUNCH AT INRAT - sandwiches and fruit	lecture thearte
	Friday	2	2pm-4pm	Divide in 2 groups - GROUP A: Root Rot Practical - observation of the less common Root Rotting Fungi, and subculturing of previous cultures (eg Take-All), GROUP B - Extraction of RLN from whitehead trays and observation under dissecting microscope	practical
	Friday	2	4.00pm-4.30pm	Coffee in lecture theatre	lecture theatre
	Friday	2	4.30pm-5.30pm	4 presentations at the end of day - Fouad Mokrani (Morocco), Mustaf Omran Ellaus (Libyia), Safieh Al-Masri Arfh (Syria), Bourbaker Jallali (Tunisia)	lecture theatre

Attachment 5 - Program

	Friday	2	5.30pm	Departure to hotel	
				free evening	
May	Saturday	3	7.00am	Departure from hotel	
	Saturday	3	7.30am-9.00am	Introduction to the less common nematodes: Root knot and Seed Gall	lecture theatre
	Saturday	3	9.00am-9.30am	Coffee in lecture theatre	lecture theatre
	Saturday	3	9.30am-12.00am	Basic molecular techniques - introduction DNA, pathogen diagnostics and MAS. Aman MULKI presentation (Syria)	lecture theatre
	Saturday	3	12.00 - 1.30pm	LUNCH AT INRAT - half salad, half sandwich and cake	lecture theatre
	Saturday	3	1.30-3.00 pm	Molecular Tool practical - possibly divide into 2 groups - GROUP A - Crown Rot Diagnostics, GROUP B - CCN MAS	lab
	Saturday	3	3.00-3.30pm	Coffee in lab	lab
	Saturday	3	3.30-5.00pm	Molecular Tool practical - possibly divide into 2 groups - GROUP A - Crown Rot Diagnostics, GROUP B - CCN MAS	lab
	Saturday	3	5.00pm	Departure to hotel	
May	Sunday	4		Free Touristic Day	
				Free evening	
May	Monday	5	7.00am	Departure from hotel	
	Monday	5	7.30am-9.00am	Screening for Resistance and Tolerance (Wallwork)	lecture theatre
	Monday	5	9.00am-9.30am	Coffee in lecture theatre	lecture theatre
	Monday	5	9.30am-12.30pm	Basic Genetics (Wallwork) and Introduction to molecular tools (Aman Mulki)	lecture/lab
	Monday	5	12.30pm-2.00pm	LUNCH AT RESTAURANT - Pizza, Icecream and Drink	
	Monday	5	2.00pm-3.30pm	Molecular Tool practical - examples provided of Fusarium Crown Rot Molecular species ID with PCR, and the use of Cre1 marker for CCN resistance in wheat (Dr Samia Gargouri and Dr Aman Mulki)	lab/lecture
	Monday	5	3.30pm-4.00pm	Coffee in lab	lab
	Monday	5	4.00-5.00pm	Molecular Tool practical - examples provided of Fusarium Crown Rot Molecular species ID with PCR, and the use of Cre1 marker for CCN resistance in wheat (Dr Samia Gargouri and Dr Aman Mulki)	lab
	Monday	5	5.00pm	Departure to hotel	
	Monday	5	8.00pm	DINNER IN HOTEL El Mouradi	
May	Tuesday	6	7.30am	Departure from hotel	
	Tuesday	6	8.00am-9.30am	Breeding Strategies to incorporate resistance to Soil Borne Pathogens	lecture
	Tuesday	6	9.30am-10.00am	Coffee in lecture theatre	lecture
	Tuesday	6	10.00am -12.30pm	Key examples of genetic resistance to control of Soil Borne Pathogens and discussion, plus chance to recap on earlier lectures	lecture
	Tuesday	6	12.30pm-2.00pm	LUNCH AT INRAT - Sandwiches and Fruit	
	Tuesday	6	2.00pm-3.30pm	Divide into two groups - GroupA - Carrot Culture, Staining and visually observation of nematodes; Group B- revise Root Rot fungi	lab/lecture
	Tuesday	6	3.30pm-4.00pm	Coffee in lab	lab
	Tuesday	6	4.00-5.30pm	Divide into two groups - GroupA - Carrot Culture, Staining and visually observation of nematodes; Group B- revise Root Rot fungi	lab
	Tuesday	6	5.30pm-6.30pm	4 presentations at the end of day - Mustafa Omran Ellaus (Libya), Fouad Mokrani (Morocco), Mohamed Emhadi Elhamar (Libya), Ben Youssef Noura (Tunisia)	lecture theatre
	Tuesday	6	6.30pm	Departure to hotel	
				Free evening	
May	Wednesday	7	6.30am	Departure from hotel for field trip	
	Wednesday	7		Field trip all day Kef Station (Water Experiment for Crown Rot and Yield Loss Trial for Cereal Cyst Nematode), Advanced Yield Trials and International Nurseries. Seminar series. Dr Rezgui Mohsem (Station Manager) followed by Dr Ben Hamouda Moncef - Agronomist. Dr Yann Manes (CIMMYT Mexico Wheat Breeder Lecture). On return visiting Dougga (touristic site)	field
	Wednesday	7		Free evening	
May	Thursday	8	7.00-8am	Breakfast in Hotel	
	Thursday	8	8.00am -10am	Introduction to Soil Health , RCTs - Resource Conserving Technologies (rotation and tillage practices - soil health)	hotel lecture
	Thursday	8	10.00am - 10.30am	Coffee Break	hotel lecture
	Thursday	8	10.30am - 11.30am	Dr Karim Ammar - CIMMYT Durum Wheat Breeder lecture	hotel lecture
	Thursday	8	11.30am - 12.30pm	Survey Techniques - qualitative, quantitative, hierarchical. Use of GIS.	hotel lecture
	Thursday	8	12.30pm - 2.30pm	Lunch at La Marsa in taxis	
	Thursday	8	2.30pm-3.30pm	Final presentations : Tassaditsid Otmane (Algeria), Hafida Khechache (Algeria), Sbei Abdennour (Tunisia), Azza Rhaïem (Tunisia)	lecture theatre
	Thursday	8	2.30pm - 5.30pm	Divide into groups - case studies 4 groups of 5	hotel lecture
			7pm	Departure from Hotel for final dinner at La Bagatelle with formal presentation of certificates	

Attachment 6 - Evaluation Form



Kirkhouse
Trust

Attachment 6: Participant Course Evaluation Form

The 3rd International Training Course of Soil Borne Pathogens of Wheat 28th April – 9th May, 2008

Held at INRAT (Institut National de la Recherche Agronomique de Tunisie) in collaboration with ICWIP (ICARDA CIMMYT Wheat Improvement Program).

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 **course similar like this** (at different country for more than one month)?

Yes **No**

If yes, could you please country and organization / course topic: _____

Attachment 6 - Evaluation Form



A. What did you think of the course?

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

How well the course met its objectives: Very well Well Somehow Rather not Didn't 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

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

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?

Attachment 6 - Evaluation Form



Kirkhouse
Trust

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

Following this course, are you willing to take 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

Attachment 6 - Evaluation Form



Kirkhouse Trust

If not, what are the constraints?

Would you recommend course like this to other people?

Yes No

Why yes/not?

What type of further interaction with CIMMYT ICARDA or Australian/French 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

Attachment 6 - Evaluation Form



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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 Julie Nicol
Course Coordinator
CIMMYT Soil Borne Wheat Scientist*

Attachment 7 - North African CCN Network

North African CCN Network

Prepared by North African Participants - Aissa Mokabli (Algeria), Najoua Kachouri (Tunisia), Fouad Mokrani and Abdelhamid Ramdani (Morocco) and Mustafa E'lleus (Libya)

Partner countries in North Africa

Tunisia, Morocco, Libya and Algeria

Objectives

To form a team of nematologists (and perhaps other wheat scientists) with ICWIP to address the research needs which include;

1. To develop uniform methodologies to work on CCN in North Africa.
2. To understand the geographical distribution of species (and pathotypes of CCN).
3. To demonstrate the economic importance of CCN in the region (if required)
4. To understand the effectiveness of currently published resistance genes and the reaction of local cultivars used in region.
5. To investigate other management options (as part of an IPM package with resistance).
6. Capacity building – postgraduate, courses, networks, symposia etc.
7. Document and extend the results of research findings to the farming community.
8. To identify and pursue funding opportunities to develop joint collaborative research programs to address research needs.

The North African CCN network should join the ICCNI

Challenges

1. limited lab facilities
2. limited greenhouse facilities
3. lack of molecular tools to help with species ID – could send DNA for sequencing – outsource for limited cost.

Partners

CG – CIMMYT and ICARDA

ARIs – Rothamsted, Belgium, INRA (members of ICCNI), PNW (USA), Australia

NARs – China, Turkey, Iran, Syria, India.

Action Steps

1. Prepare a 2-3 page summary of our current knowledge of CCN in NA – distribution, species (pathotype), yield loss, control measures (genetic resistance/rotation, etc).
2. If we host the ICCNI meeting in Turkey in late 2008, that one representative from each North African countries joins this meeting.
3. To look for funding opportunities back in your countries.

Attachment 8 - Suggested Future Action

Suggested Future Action Steps from the 3rd International SBP course on wheat in Tunisia

10 May 2008

Notes taken from a post course discussion with key INRAT colleagues Prof. Lester Burgess (Uni Sydney, Crawford Foundation), Dr Julie M Nicol (CIMMYT), Dr Gharbi Salah and Dr Samia Gargouri (INRAT Tunisia)

- **Fusarium identification workshop in French for North Africa – possibly for 2009 in Tunisia**

Action: Lester to discuss with ATSE Crawford for support...suggest around 8-10 participants.

- **Fact sheets (max 3-4 pages) for both Crown Rot and Cereal Cyst Nematode prepared by key participants.**

Action: Julie to coordinate with Aissa (Najoua, Elleaus and Mokrani) to prepare for CCN.

Action: Samia to coordinate with North Africans to update the status of CR in the region.

Once we have these facts sheets they will be circulated to the Directors at ICARDA and CIMMYT, in addition to being sent to the National Program Heads in various countries.

- **Establishment of the North African Cereal Cyst Nematode Network.**
- **North African CCN participants (Najoua, Elleaus, Mokrani & Mokabli) to attend and join the 2nd ICCNI (International Cereal Cyst Nematode) in Turkey in 2009.**

This meeting the key ARIs (Belgium, UK and France) with Turkey and China. The second meeting is hoped to extend to Iran, Syria plus North Africa (maybe USA).

- **Germplasm exchange**
 - Julie Nicol (Karim Amar and Yann Manes) to prepare specific nurseries to send again to Tunisia and other North Africans interested in both CR and CCN.
 - Gharbi to send Julie Nicol some key lines from Tunisia to see their reaction to CCN and CR.

Attachment 8 - Suggested Future Action

- **Cyst Exchange**

- Julie Nicol to receive in Turkey CCN cysts from North African colleagues which will be used in the CCN quarantine collection and the key genes of resistance (eg *Cre1...8*) screened against these populations. These will also be housed in Belgium with Prof Moens for future collaborative work.

- **TUBITAK RR CCN project**

- Julie Nicol suggests that a joint bilateral project be set up between Turkey and Tunisia to address some of the issues associated with CR and CCN that are common to both countries. This project could be prepared by Ankara Uni (and PPI Ankara, CIMMYT) and could include aspects such as;
 - Monitoring rotation trials in El Kef (Tunisia) and Haymana (Tk)
 - Perhaps looking at the importance of water in damage relations
 - Perhaps exploring the biology of *F. culmorum* in both countries under field conditions (eg the importance of survival of chlamydospores and root vs crown/stem infection).
 - Assessing some aspects of resistance (screening or other)

Action: Julie to discuss further with Ankara Uni

- **Scientific exchange/training**

- Send a young person to Turkey for training in CCN and CR in 2009.
- Get some representation (Samia G) to attend Fusarium WS in Sardinia.
- Possibly one Tunisian (PhD student) to PNW – USA for part of their training (2009 – Samira or other?). One North African could spend some months in Belgium working with Prof. Moens.