

MASTER CLASS ON PLANT HEALTH

Plant Health Clinics for Agricultural Productivity

The Laboratory in the Field

the practical use of new technologies
in community-based extension



Eric Boa and Florence Chege

Nairobi • Kenya

21 November – 2 December 2011



Summary

Participants working in extension, diagnostics, crop protection and biosecurity learnt new methods for the identification and detection of pests and diseases. They saw how extension and research could work together through plant clinics to address common objectives in increasing agricultural productivity and improving surveillance. The Masterclass was a unique opportunity for plant health people from West, East and Central and Southern Africa to share experiences and gain practical experience of tools and methods developed and used by Plantwise and PaDIL. The course identified new opportunities for Australia and CABI (and member countries) to work more closely and promote joint work in international trade and development – and we hope run more courses in future.



BACK ROW: Michael Thomas, Charles Aben, Eric Boa, Gary Kong, Tomas Chinconela, Brian Nsofu, Phil Taylor, Roger Day*, Andrew Mugalula, Melese Haile MIDDLE ROW: Patrick Mumbere, Mathe Lukanda, Tony Kamau, Urinaitwe Warren, Teshome Burka FRONT ROW: Lourena Arone, Rose Kamau, Morris Akiri*, Hortense Diallo, Dr. Ephraim Mukisira (Director, KARI – chief guest), Dennis Rangi*, Anna Providence, Lucy Karenja, Bellancile Uzayisenga, Asenath Koech. * CABI Africa staff. NOT PRESENT: Fatmata Kaiwa and Foday Koroma.

Venue and dates

The course was held at the World Agroforestry Centre in Nairobi from 21 November to 2 December 2011.

Funding

Crawford Fund and Australian Aid, with contributions in kind from CABI Plantwise programme and Plant Biosecurity CRC.

Trainers

Eric Boa, Phil Taylor, Rob Reeder (Plantwise, CABI); Gary Kong; Michael Thompson (Plant Biosecurity CRC, formerly CRCNPB)). Assisted by Lucy Karanja (CABI).

Participants

Twenty people attended from 10 African countries – Zimbabwe, Cote d'Ivoire, Mozambique, DRC, Ethiopia, Rwanda, Sierra Leone, Zambia, Kenya and

Uganda. Some worked in extension and were running plant clinics, others ran diagnostic services, provided technical support services or had statutory roles related to biosecurity. See Annex 1 for details of participants.

Acknowledgements

Florence Chege was in overall administrative charge. We thank CABI staff (Duncan Chacha, Linda Likoko) in Nairobi for organising accommodation and transport to: Machakos for a plant clinic; Nyathuna to collect and observe crops; and to KEPHIS and KARI for study tours. Thanks also to: Keith Shepherd for giving a guest lecture on African soils and for showing participants around analytical labs; and to Dennis Blight for representing the Crawford Fund and sharing his insights and enthusiasm.

Introduction

The course explained and demonstrated simple methods for identifying and diagnosing pests and diseases. The practical aim was to suggest how these methods could be used to improve community-based extension, and in particular assist those running plant clinics.

The Master class was held under the auspices of Plantwise, a programme which helps farmers 'lose less and feed more' through plant clinics incorporated into a plant health system. Clinics are run by local extensionists and supported by specialists and sources of technical assistance. The plant health system includes regulatory bodies with statutory roles in crop protection, including early detection and confirmation of pests and diseases. Plant Biosecurity CRC covered the latter, integrating the joint efforts of Australia and CABI for the benefit of a multinational audience drawn from diverse professional backgrounds.

Extensionists need all the assistance they can get to cope with the myriad problems that attack a bewildering range of crops. An accurate diagnosis is essential for identifying the best management advice and alerting the authorities to new and emerging pests and diseases. Biosecurity and food security go hand in hand, as do a mix of hi- and low-tech methods and approaches: practical laboratory methods which don't require major investments in equipment; simple, reliable web-based resources for identifying and managing pests and diseases; field diagnosis and photosheets.

A busy two week schedule (Annex 2) included field visits to collect and photograph samples, observe a plant clinic in action (and meet the redoubtable Regina, head of Kataloni Community-Based Organisation) and learn more about the Kenyan Plant Health Inspectorate Service (KEPHIS) and the Kenyan Agricultural Research Institute (KARI).



Plant clinic at Machakos: everyone crowded round



Collecting samples and fresh air

The course covered all types of pests and included practical exercises on soil testing. Participants saw sophisticated equipment in use at ICRAF (for soil analysis), learnt about PCR, used hand lenses with built-in lights, tried out cheap and expensive digital microscopes, got to grips with digital photography and made their own photosheets. They signed up to PaDIL and became part of wider plant health community.

Expected outcomes

- Learn how to use new technologies for diagnosing plant health problems in the field
- Evaluate the benefits and limitations of new technologies through practical exercises
- Improved communication skills for explaining and interpreting plant health problems
- Better understanding of how extension and research can work together to improve support to farmers; how to organise scientific and technical support services to meet the needs of plant clinics and extensionists generally.

Hands on, have a go

The course had a wider strategic aim of linking field-based diagnostic methods and tools to improved surveillance and detection of plant pests and diseases. The practical sessions on lab-based method ranged from use of rapid test kits to detect key pathogens and isolation of fungi from plant material to extraction of nematodes.

Participants received a thorough introduction to PaDIL (Pest and Diseases Identification Library). They were signed in as members of this unique web portal and explored how to use the available tools and resources for detection and confirmation of pests and diseases. A practical session on distance diagnostics showed how two ‘remote’ (in reality just down the corridor) stations would talk to each other and try to identify a pest, for example.

This course was the first opportunity for a broad audience of extension and research workers to see and try out methods for themselves. The course included people already running plant clinics (DR Congo and Kenya), those supporting clinics (Uganda and Sierra Leone) and those wanting to take part in Plantwise (Zambia, Mozambique).

Field visits to collect samples and see a plant clinic in action ensured that the technophiles were reminded of the context and ultimate target of their efforts: improving agriculture. The course introduced ‘pregnancy testing kits’ – lateral flow devices – for confirming *Phytophthora* and *Pythium* that anyone can use. Bacterial streaming and nematode extraction use basic equipment (glass, water, sieve) that’s widely available. We discussed the practical applications of these tests and how the results could be used.

Taking photographs and interpreting pest features and symptoms was an important part of the teaching. The widespread availability of cheap digital microscopes has opened up new possibilities for identifying pests and diseases in the field, yet few of our trainees had had the opportunity to try them. Guided by experts, trainees had a go and gained confidence (Annex 3) in using the different types of microscopes we brought for the course.

Participants were trained in the use of USB microscopes and a user manual was provided for future reference.

Instruction was given on how to navigate the PaDIL website, to create a personal Dashboard with user login, enter simple and complex search queries according to the pest information required and to make comparative image tables and save them to the personal Dashboard. PaDIL is an excellent resource to aid in pest identification, with users being able to personalize and customize information to suit their own pest information needs, and to save, download, print or share that information with others. PaDIL pest identification information complements that of diagnostic and decision-making tools for pest management in Plantwise.



- Phil Taylor demonstrates a basic isolation technique for fungi using tap water agar – for many this was a ‘new’ method

Several participants expressed an interest in adding content to PaDIL. The trainers encourage the development of regional pest image libraries relevant to local users and one participant from Ivory Coast is already working with PB CRC in Australia to do this..

Digital tools have great potential to enhance the process of pest identification and as technologies become more accessible, some of the current barriers to accessing information in developing countries will start to disappear. The Master class was a good starting point for showing how this could happen. Equipment used during the course (e.g. USB microscopes) were distributed to selected participants to use in their work. The experience of seeing people use these and other items has helped Plantwise staff understand better how to equip plant clinics in future.

What did participants think of the course?

Annexe 3 describes participant's responses on course quality and knowledge gained. The course was ranked highly on 'quality of course'. There was more equivocation on 'knowledge gained', with a few 'neutral' scores. We will use the feedback to improve future courses, should the opportunity arise. Some struggled with English, a reminder to speak slowly and clearly. One person thought there was insufficient time to understand the exercises and messages they were meant to convey. Half the participants 'agreed' that the content was easy to understand. The other half 'strongly agreed', suggesting that further work is needed in class to ensure that everyone has a good grasp of exercises.

Most participants felt the training would improve service delivery at their work place. A few people said that they weren't sure that the course had improved their capacity to do research, which, though not an express aim of the course, needs further attention in future.

Annex 4 summarises comments and feedback via letters that participants wrote to the teachers ('Dear Teacher'). People are used to writing letters and can freely express thoughts. The feedback mirrors much of what is in Annex 3, though expressed in direct quotations rather than fixed statements that are scored. Annex 4 captured more of the enthusiasm and pleasure that many expressed to the teachers at the end of the course..

Lessons Learned

Through Plantwise and plant clinics CABI will continue to monitor the longer term benefits of this course though there is no formal mechanism for reporting. It will be more difficult to see the immediate benefits for biosecurity from this course, though follow-up is possible where people attending work in diagnostic laboratories linked to plant clinics (Uganda and Kenya).

Selection of participants for a course with such a broad range (distance diagnostics, photography, lateral flow devices, soil testing, PCR, field diagnosis) needs careful attention. and we recognize that it will be difficult to satisfy everyone's needs. However, we feel that the training has made a difference in the way that trainees will approach and attempt to improved extension and biosecurity, and that linking the two together has benefited everyone – including the teachers.

A pre-course survey is a useful tool for selecting suitable trainees. The training material has been fully tested and the feedback has suggested improvements, in addition to those identified by the trainers themselves.

The variety of topics dealt with meant that participants were never bored (at least no one complained!) and though challenging it times, we feel confident that we've covered a lot of

ground in a short time and shown how the complex relationship between extension and research can be better understood and improved through short, intensive training.

The course discussed the CABI Knowledge Bank (an integral part of Plantwise) and briefly demonstrated mapping of pest records, as well as method for scanning in clinic data, the information gathered about queries presented by farmers, the diagnosis and recommendation provided. There was limited opportunity to explore the pest mapping and data scanning but we expect further opportunities to arise for training and awareness raising as Plantwise continues to expand its operations together with many of the people who attended this course.

Accurate Descriptions ERIC BOA AND PHIL TAYLOR • PLANTWISE

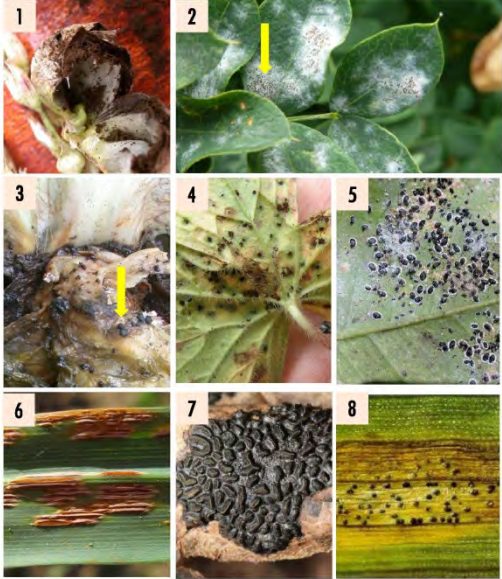
CURLING LEAVES write a short description, which another person will use to try and identify the sample.



LEAF SYMPTOMS write a short description, which another person will use to try and identify the sample.



Find the fruiting body These photographs show fruiting bodies of fungi. Try to name them from the list below. One photograph is not a fungus. ERIC BOA, PLANTWISE



Name the fungal fruiting bodies shown in the photographs. Choose from the list below or make other suggestions. You can use the names for fruiting bodies more than once.

Pycnidia (leaf spot) • Apothecia (leaf spot) • Rust pustules • Sclerotia • Cleistothecia (mildew) • Smut pustule

photos Eric Boa

Two photo-exercises (created specifically for this course) used to test interpretation and recognition of symptoms and other features

Annex 1

List of participants

PERSONAL DETAILS	ROLE, AFFILIATION AND RESPONSIBILITY	COUNTRY	ADDRESS/CONTACTS
Hortense Diallo [f] <i>Ph.D. Plant Sciences (Plant Pathology)</i>	Lecturer/Researcher <i>Faculdade de Agronomia e Eng. Florestal; Universit�d'Abobo-Adjam�</i> Teaching and research; supervise students; Director of Cabinet of the President.	Cote d'Ivoire	Adibjan Tel: +225 07 08 65 66 attakhortense@yahoo.com
Mathe Lukanda <i>Agronomy</i>	Assistant <i>Universit� Catholique du Graben (UCG), Butembo</i> Research in crop protection focusing on banana pest and disease management	DR Congo	Universit� Catholique du Graben (UCG), Butembo Tel: 243-994339704 lukandamathe6@gmail.com
Patrick Simbalalya Mumbere <i>Agronomy</i>	Coordinator, Plant Clinics <i>Esco Kivu srl (company)</i> Organisation, programming and supervision of plant clinic activities, data collection, diagnosis of problems on various crops	DR Congo	Esco Kivu srl Tel:243-997778993 patrianamumberesimbalalya@yahoo.fr
Melese Haile <i>MSc in Plant Pathology</i>	Senior Expert <i>Ministry of Agriculture</i> Deliver Phytosanitary material; participate in Pesticide Registration Dossier evaluation and variety release evaluation.	Ethiopia	P.O. Box 62347, Addis Ababa Tel: 251 911318064 tefhai@gmail.com; hl_teferi@yahoo.com
Teshome Burka <i>MSc agronomy plant protection</i>	Technical expert; advisor; extension work <i>Oromia Agric Development Bureau, Ministry of Agriculture</i> Survey, control and advisory service on regular and migratory pests	Ethiopia	Oromia Agric Development Bureau Tel: +251 911399403 burkaabdulkarin@yahoo.com
Asenath Koech [f] <i>Masters Degree – studying for PhD on fruit fly infestation on of export fruits</i>	Plant Health Inspector <i>Kenya Plant Health Inspectorate Service (KEPHIS)</i> Pest risk analysis, pest surveillance (pest surveys), plant health inspections for compliance to phytosanitary requirements and certification	Kenya	P. O. Box 49592 Nairobi, Kenya Tel: +254 020 3536171/2 Tel: 254-735309080 akoech@kephis.org
Lucy Karanja [f] <i>M.Sc. in Microbiology and Biotechnology</i>	Laboratory technician/ Microbiologist <i>CABI</i> Setting laboratory experiments, isolation of microorganisms, microbial culture maintenance	Kenya	ICRAF Complex, United Nations Avenue P.O. Box 633-00621, Nairobi
Noah Phiri <i>PhD Plant pathology</i>	Plant Pathologist <i>CABI</i> Diagnosing and advising farmers on plant health issues	Kenya	ICRAF Complex, United Nations Avenue P.O. Box 633-00621, Nairobi
Rose Kamau [f] <i>BSc. Agriculture general, post graduate diploma in education</i>	District Horticulture Crops Officer - extension officer/advisor <i>Extension service, Nakuru District, Min of Agriculture</i> Advise on all husbandry aspects of horticulture crops in district	Kenya	Ministry of Agriculture Nakuru, Kenya Tel: 0713-951984 kilimonkrnorth@yahoo.com

PERSONAL DETAILS	ROLE, AFFILIATION AND RESPONSIBILITY	COUNTRY	ADDRESS/CONTACTS
Tony Kamau Wanyoike	Laboratory Technologist <i>Kenya Agricultural Research Institute (KARI)</i>	Kenya	P.O. Box 57811-00200 Nairobi Tel: 254-721-633805 tonkam15@yahoo.com
Lourena Arone [f] <i>BSc agricultural sciences</i>	Assistant <i>Faculty of Agronomy and Forestry Engineering, Eduardo Mondlane University</i>	Mozambique	C.P. 257, Maputo Tel: 258-21-492177/8 lourenaarone@gmail.com lourena.arone@hotmail.com
Tomas Chiconela <i>Doctorate in Plant Health</i>	Head of Plant Protection Department <i>Faculty of Agronomy, Universidade Eduardo Mondlane</i> Management of the department; leads team of lecturers in the delivery of the curriculum, including its development	Mozambique	C.P 257, Maputo, Mozambique Tel: 258-21-492177/8 Fax:258-21-492179 tchiconela@uem.mz tfchico@yahoo.com
Bellancile Uzayisenga [f] <i>Masters</i>	In charge of crop protection <i>DDG – Extension, Rwanda Agriculture Board</i> Provide leadership for crop pest & disease management (CPDM) programs	Rwanda	Rwanda Agriculture Board Tel: 250-0-788599377 uyibella@yahoo.fr
Fatmata Kaiwa [f]	Lecturer <i>Dept. of Biological Sciences, Fourah Bay College, University of Sierra Leone, Freetown</i>	Sierra Leone	University of Sierra Leone Mt. Aureol, Freetown Tel: 232-78331979 fkaiwa@yahoo.com
Foday Koroma <i>Certificate in General Agriculture</i>	Phytosanitary Technical Officer <i>Crop Protection Services, MAFFS, Freetown</i> General Inspection of plant materials, products and regulated articles	Sierra Leone	Ministry of Agriculture, Forestry & Food Security, Yoruji Building, Freetown Tel: 076 511901 Fodaymkoroma2@yahoo.Com.
Andrew Musoke Mugalula <i>PhD Agricultural Sciences – Plant Pathology</i>	Senior Agricultural Inspector-Diagnostics and Mobile Plant Clinic Coordinator <i>Ministry of Agriculture, Animal Industry and Fisheries [MAAIF]</i> Coordinate mobile plant clinics in Uganda	Uganda	Crop Protection Dept. (MAAIF) P.O. Box 102, Entebbe Tel: 256-771-873737 Mugalulaandrew@yahoo.com
Charles Aben	Zonal Coordinator <i>National Agricultural Advisory Services (NAADS)</i>	Uganda	NAADS Secretariat, Kampala Tel: 256-775-162066 charlesaben@yahoo.co.uk
Urinaitwe Warren <i>Master of Science Student</i>	Research Assistant IPDN Project <i>Makerere University</i> Investigating viruses infecting tomato in Uganda and other disease related issues received by IPDN-Uganda	Uganda	Collage of Agriculture and Environmental Studies, P.O. Box 7062, Kampala Tel: 256-711196405 warrenarinitwe@gmail.com
Brian Nsofu <i>BSc agricultural sciences</i>	Research officer <i>Zambia Agricultural Research Institute</i> Conducting phytosanitary inspections and certification, pest risk analysis, national enquiry point	Zambia	Private Bag 7, Chilanga, Zambia Tel: 260-211278130/141; 260-966039504 Email:briannsofu@hotmail.com
Annah Providence [f] <i>Bachelor of Science Degree in Horticulture</i>	Research Officer <i>Plant Protection Research Institute – Ministry of Agric</i> Research on biology, ecology and management of insect pests of agricultural importance.	Zimbabwe	P.O Box 550 CY Causeway, Harare Tel: 00263-733-825676 peeanne@gmail.com

Annex 2

Training Schedule

WEEK 1	EVENT	NOTES
Monday • 21 Nov	Introduction to course Field diagnosis – recognizing and interpreting symptoms Isolation of pathogens Distance diagnostics: intro to day 2	Getting to know each other, outline of course, expected outcomes, general housekeeping. Describe symptoms, identify fungal sporing bodies, recognizing spores. ABC test. Select plant samples from the ICRAF campus. Isolate on tap water agar; surface sterilization and basic techniques..
Tuesday • 22 Nov	Introduction to PaDIL. Use of USB microscopes to record images of diseased plants and pests. Basic photography Perpetual salience (realistic field diagnosis)	What is PaDIL? Explain why it is a powerful tool for pest identification. Remote microscopy and digital microscopy exercise. Taking sharp, well-composed photographs turns out to be more difficult than most people thought ...
Wednesday • 23 Nov	Field visit to Nyathuna. Photosheets and how to make them yourself Videos for diagnosis	Visit 3 farms and take videos and pictures of diseased crops. Chose photosheet topics and start putting together. Show video explaining a plant health problem seen at Nyathuna
Thursday • 24 Nov	Visit to Machakos and Kataloni Community Based Organisation to observe plant clinics.	Use digital microscopes, learn more about samples brought in by farmers.
Friday • 25 Nov	PaDIL demonstration inviting user participation. Use of Skype to share screens. Finalise photosheets	Get trainees involved in PaDIL. Sign up and form communities. Review progress on distance diagnostics, findings and implications. What next? Complete photosheets, publish
WEEK TWO	EVENT	NOTES
Monday • 28 Nov	Macro photography Remote diagnostics: making it work for you using various methods. Review fungal cultures; test for bacterial streaming.	In week one people learnt how to transfer images to a remote source. Now access and use images for identifications. The cultures which were subbed on last week will need to be monitored.
Tuesday • 29 Nov	Visit to Kephis and KARI labs	All day visit to the labs of Kenyan plant health Inspection service and Kenyan Agricultural Research Institute.
Wednesday • 30 Nov	Visit to the soil testing lab at ICRAF Information on soil and soil health Use of rapid field/lab diagnostic techniques including, making microscope spore preparations, sellotape mounts, , moist chambers, iodine test. Review fungal cultures. Where and when to send samples Nematode extraction from soils. Packaging of plant materials for sending to diagnostic labs	Plant health also depends on soil fertility. Learn about simple tests to assess soil health using facilities at ICRAF. Use of internet and reference material to identify fungi from spore morphology Compile list of labs that receive plant samples for diagnosis. Nematodes require an overnight extraction and this will provide material for Thursday.
Thursday • 1 Dec	Killing and fixing nematodes from overnight extraction. Use of immunological test strips for detecting pathogens and consumer test of this methods. Research-extension 'trees'. Show how organisations are connected.	Lateral flow devices are becoming much more common and PCR is heading into the field too. We will have exercises on their use. Nematode killing and viewing. The organisation of extension differs. The 'trees' attempt to explain this and get participants thinking about who they could work with – and how.
Friday • 2 Dec	Round-up discussions on topics. Field versus laboratory diagnosis. What next? How will participants use information and insights developed during two weeks?	Summarise findings from all topics Compare different diagnostic techniques used in plant clinics Finish noon or early afternoon

Annex 3

Feedback: course delivery and knowledge acquired

There were 18 responses.

Quality of the Course	Strongly Agree	Agree	Neutral	Disagree
1. The content of the training course was directly related to my field of work at time of completion	16	2		
2. I was provided with adequate supporting material	14	4		
3. The trainers/ mentors were knowledgeable and provided lectures/information of a good quality	16	2		
4. The content was easy to understand	9	9		
5. The level of English used was good	10	6	2	
6. There was sufficient time allowed for the training event to get a good understanding of the content	9	8		1
7. The course was well balanced between theory and practice	13	5		

Other comments

- The course content was sufficient and quite informative
- Time keeping and programme were good
- In the future training should also include a bit more on entomology especially on specimen preparation and preservation
- Trainers approach was refreshing and entertaining
- More support material required to help in field of diagnostics
- Generally the course was good and covered all aspects of laboratory and field diagnostic. We were given an opportunity to practice what we were taught
- The trainers were very devoted
- Practical materials were fully facilitated
- CABI and Plantwise and other collaborators are very good source of basic and relevant knowledge and practices that can help pest management in the world. You are good all in all. Thank you
- More time than one day is needed to cover the PCR technique

Knowledge Gained	Strongly Agree	Agree	Neutral	Disagree
1. The training increased my knowledge of international trends/activities	11	6	1	
2. I increased my capacity to conduct research	8	4	4	
3. I better understand issues and principles in my field	11	6	1	
4. I acquired new technical skills	12	6		
5. I acquired new ways to approach work problems	10	8		
6. I learned techniques for managing and organising people and projects	6	10	2	
7. I learned new or improved ways to communicate with networks within my field of expertise (e.g. farmers, donors, research organisations, government)	15	3		

Other comments:

- I appreciate the techniques learned and knowledge gained will surely improve my service delivery in my work place.
- The knowledge gained is applicable to my work – very good
- The training was very relevant as an eye opener on the amount of technology at our disposal to help with agricultural problems. It will be very nice if all countries present are able to apply all the knowledge acquired for the betterment of their countries and CABI to follow up on plant clinics. Thank you very much for making this training possible to us
- I learned how extension and research work in different countries
- The training also afforded me the opportunity to have a hands-on trial with some new and less sophisticated field equipment
- Hope to continue sharing this knowledge at place of work. CABI should follow up on this great course I gained knowledge in taking, sending and using photographs. I also learned new ways of sending images for diagnostic purposes. I also gained knowledge in sharing images and using them to diagnose diseases
- It is my hope that the trainers/mentors will be there for us and continue to mentor us especially in countries where plant clinics have not yet been established

Annex 4

Other responses from participants

Participants were asked to write a short letter with comments about the course. The 'Dear Teacher' letter captures feedback that questionnaires may miss. Participants were asked to say what went well, what could be improved and how the information gained from the course would be used their jobs.

- The training content was directly related to my day to day activities.
- You are very good teachers as you make everything simple and easy to understand.
- I liked very much all rapid field diagnostic techniques and it will help me to improve the quality of plant clinics and to serve farmers.
- The training was above and beyond my expectation.
- The course has ended so fast because it was very practical and we were involved at almost all stages.
- Good photos can solve a farmers' problem may be without even sending a sample.
- PaDIL tools, photosheets and field diagnosis ... will be very useful in my future work.
- I feel the course is more biased towards diseases and I think insect pests need equal attention.
- The relevance of the talk on African soil to plant health was not very clear.
- The Masterclass ... widened my horizons.
- Eric and Phil made me appreciate the use of good photography in diagnosis.
- The production of the photosheet added a whole new dimension to easy diagnosis, particularly at plant clinics.
- Rob and Phil opened my eyes to simple but efficient and quick methods of testing fungi, bacteria and nematodes in the field.
- The course can be improved on by having a well-structured programme made available to trainees (beforehand) – not prepared by day.
- You helped me update my teaching methods (for university students).
- The content of the training course was directly related to my field work.
- (The course should be) done once a year especially for countries that are involved with the day to day running of plant clinics.
- I would like to thank you for your fantastic pragmatic and refreshing training approach which enabled us to follow keenly and grasp things easily.
- Though there was an attempt to explain PCR I didn't find it as expected. I was expecting a practical training on PCR – this was not possible. I hope you will consider this in the future.
- For every theory you taught, it was accompanied by a practical session.
- Almost every unit that I covered was directly related to my everyday activities.
- Different websites such as PaDIL, Plantwise etc. will go a long way in building my career and solving problems.

- The teachers were people with enough knowledge in the area ... (you are) explaining very well, easy to understand, because I ... speak Portuguese and ... little of English. All the participants feel good and a classroom not boring.
- I can pass knowledge to my students about the importance of images for demonstration of symptoms.
- The materials were well prepared and the learning atmosphere was good. I learnt in a week what I never learnt in three years in school.
- First and foremost am grateful for your simply clear and unique methods of communication: (you) blew up my whole view of extension. The best part of the course was the use of photography in routine diagnosis. The practical drills on in-field techniques ... greatly motivated me to take the little pathology I know to where it should go (farmer fields).
- I just want to thank you for taking time out to prepare such an amazing and life changing course. The use of technology and distance diagnosis is exactly what we need in Africa, where so much is expected of research and extension with very minimum to nothing support provide. Distant diagnostics will help us to reach farmers in time and be able to nip the problem in the bud.
- The distance diagnostic techniques are excellent and will work for my country. The course can be improved with more theory on mycology and virology.
- Getting access to PaDIL and Plantwise databases is good news for us. This is quite useful when conducting pest risk analysis as well as pest identification and advisory services.
- Visiting other laboratories was a very good idea ... we got to know what other institutions are doing.
- Les matériels didactiques ont été présents chose qui peuve à que point l'atelier était bien préparé. J'admire aussi la façon don le cours a été présenté.