



Rothamsted International

Sharing research excellence: international collaboration and capacity building for the benefit of agriculture in developing countries

Dr Deying Ma
Xinjiang Agricultural University
People's Republic of China

Deying Ma started work for her Rothamsted International Fellowship in April 2005 on a project titled "Biology and insecticide resistance of whiteflies (*Bemisia tabaci*) on crops in Xinjiang Uygur Autonomous Region, China". She is doing this research in the Plant and Invertebrate Ecology Division supervised by Ian Denholm and Kevin Gorman.

Xinjiang Uygur Autonomous Region is in north west China, where agriculture accounts for about 45% of the local economy. Cotton is a very important crop, making up about 30% of China's production, and other major crops include vegetables, grapes and ornamental flowers.

Bemisia tabaci, or the tobacco whitefly, is a small insect pest which feeds on a wide range of crops and transmits a large number of plant viruses during feeding which affect crop yield and quality.



Adult whiteflies resting on a plant

In China, as in other parts of the world, *B. tabaci* is resistant to several important groups of chemical insecticides. The species *B. tabaci* is composed of a number of biotypes that are assigned identifying letters, from "A" to "T". Although these biotypes belong to the same species they can have quite different biological characteristics. The most common biotypes are the "B" and "Q" biotypes; the "B" biotype is found throughout the world and the "Q" biotype in the Mediterranean region, USA and some parts of China.

Part of Deying's work as a Rothamsted International Fellow has been to determine which of the *B. tabaci* biotypes is dominant in

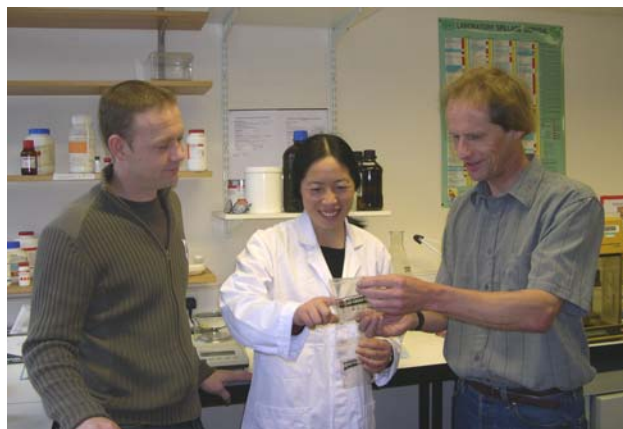
Xinjiang and what level of resistance there is to the commonly used and novel insecticides.

By testing several strains, Deying has shown that the potentially most damaging "Q" biotype is not present in Xinjiang for the time being, and all of the *B. tabaci* samples were confirmed as the "B" biotype.

Testing adults and eggs of *B. tabaci* collected from different host plants in Xinjiang, such as poinsettia, cotton, grape and melon, Deying found that the whiteflies were all very resistant to cypermethrin (a pyrethroid insecticide) but susceptible to other insecticides including abamectin. Abamectin is a neurotoxin belonging to a group of insecticides originally isolated from a species of *Streptomyces* bacteria from soil in Japan.

Deying's research findings have direct implications for the advice which needs to be sent out to farmers in Xinjiang. This information dissemination has already started while Deying is still at Rothamsted and the advice will be updated with the results of further experiments which are planned to start soon.

The Rothamsted International Fellowship has provided Deying with training in methods used to diagnose insecticide resistance and biotype status, and the award has also strengthened collaboration between Rothamsted and Xinjiang. It is hoped that future planned research projects will consolidate existing links to help training and capacity building for scientists at Xinjiang Agricultural University.



Kevin Gorman (left), Deying Ma (centre) and Ian Denholm (right) in the laboratory

New Rothamsted International Fellows

The following Fellowship awards were made in 2005 and all the scientists are expected to start from early 2006.

Dr Mumuni ABUDULA, CSIR Savanna Agricultural Research institute, Ghana

Six months with Dr Sam Cook (Plant and Invertebrate Ecology Division). Project titled "Use of plant induction technologies in 'push-pull' pest control strategies". He will also be training at ICIPE in Kenya.



Desmodium species play a crucial role in "push-pull" for pest and weed control in Africa

Dr Liping BAN, Nanyang Normal University, China

12 months with Dr Jing-Jiang Zhou (Biological Chemistry Division). Project titled "Molecular identification and functional characterisation of odorant-binding proteins in host-adapted *Anopheles* mosquitoes".

Dr Mingsheng FAN, China Agricultural University, Beijing, China

12 months with Prof. Steve McGrath and Dr Fangjie Zhou (Agriculture and Environment Division). Project titled "Selenium in crops: impact of agricultural practices and strategies for biofortification".

Lucila GOMEZ-GIL, CENSA (National Centre for Plant and Animal Health), Cuba

12 months with Prof. Brian Kerry (Nematode Interactions Unit). Project titled "Biotic factors affecting the parasitic activity of *Pochonia chlamydosporia* in soil".

Dr Xiaorong ZHAO, China Agricultural University, Beijing, China

12 months with Prof. Phil Brookes (Agriculture and Environment Division). Project titled "A comparison of contributions of soil microbial biomass phosphorus to phosphorus leaching in aerobic and waterlogged Chinese and UK soils".

African Fellows Programme: third call in October 2005



The African Fellows Programme (AFP) started in July 2004 and is targeted specifically at African scientists who wish to work with European partners on important problems in African agriculture. AFP scientists can be based at any university or institute throughout Europe for periods of four to 12 months.

For the third deadline in October 2005, 95 pre-proposals were received of which;

- 37% were from Nigeria, and about 27% of pre-proposals were from Ethiopia, Ghana, Kenya and Tanzania combined
- median age of applicants was 37 years old (minimum 24, maximum 57)
- 24% of applications were by women

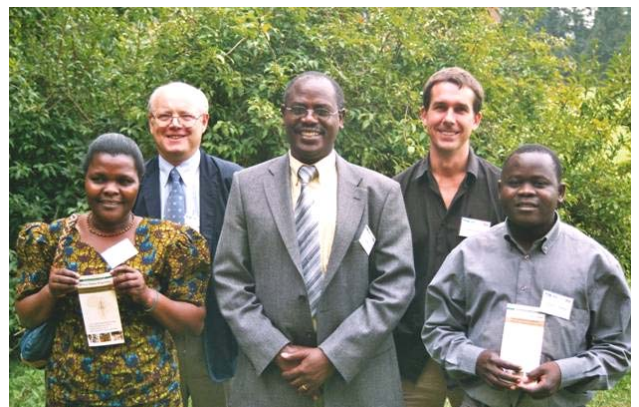
The next deadline for pre-proposals is 6th March 2006. Guidelines and application forms are available from the Rothamsted International web site.

African Fellows appointed in 2004

Two awards were made from the first call in 2004 which were for:

Dr Josephine NAMAGANDA, National Agricultural Research Organisation, Entebbe, Uganda. Started in July 2005 for six months with Prof. Howard Atkinson, University of Leeds, UK, working on banana improvement for Uganda.

Dr Valente ARITUA, Kawanda Agricultural Research Institute, Kampala, Uganda. Started in October 2005 for 10 months with Dr Julian Smith, Central Science Laboratory, UK, working on the epidemiology of banana bacterial wilt.



(from left) Josephine Namaganda, Howard Atkinson, Wilberforce Tushemereirwe (Kawanda Agr. Res. Inst.), Julian Smith and Valentine Aritua

Joint Laboratory with China

Scientists from China make up about 30% of the successful applicants who have been awarded Rothamsted International Fellowships, and the advanced training they receive at Rothamsted has been of great benefit in their subsequent careers as many are now influential in making science policy decisions in China.

In the latest development with China an agreement for a new joint research laboratory, was officially signed in June 2005 between Rothamsted Research and Nanyang Normal University in Xi'an. Prof. Yunchao Kan from Nanyang worked with Dr Jing-Jiang Zhou and Prof. Lin Field of the Biological Chemistry Division to bring about this association, which was initially devised by Prof. Kan while he was at Rothamsted on a project funded by the Royal Society.



Lin Field (centre) and Jing-Jiang Zhou (right) in discussion with a colleague at Nanyang

The main goal of the Nanyang-Rothamsted Joint Laboratory is to carry out research and develop technologies for environmentally-sensitive pest management and sustainable agriculture. Specifically, research will devise novel strategies for the identification and exploitation of naturally occurring semiochemicals that bring about different pest behaviours.

Dr Zhou and Prof. Field will assist in helping to develop the science and skills base at Nanyang, both by visiting the laboratory for discussions and by hosting Chinese scientists at Rothamsted to carry out research projects relevant to the overall aims of the Joint Lab.

The first ever UK-China joint lab was opened in December 2000 between the Crop Performance and Improvement Division and Huazhong University of Science and Technology (HUST), which was initiated by Prof. Guang He who was a Rothamsted International Fellow in 1996.

Overseas delegations in 2005

During the past year we have hosted ten official visits and delegations from various developing and emerging countries. These were from;

Brazil

- British Council, Curitiba, Parana State
- Agricultural Institute of Parana (IAPAR)

China

- Chinese Academy of Agricultural Sciences
- Northwest A&F University, Yangling
- Science and Technology Bureau, Xinjiang
- Inner Mongolia Academy of Agric. Sciences
- London Embassy staff, P.R. China

India

- National Resources and Research Institute, Kerala

Malawi

- Bunda College, Norwegian Embassy (Malawi) and Norwegian University of Life Sciences (UMB)

Uganda

- Namulonge Agricultural Animal Production Research Institute, Makerere University, Sasakawa Africa Foundation

Scientific Publications

Rothamsted International Fellowships provide an opportunity for developing country scientists to publish their work in international journals which are highly respected in particular research areas. Since the start of the Fellowship scheme in 1993 up to April 2005, a total of 89 refereed articles were published in peer-reviewed journals.

The average impact factor from 80 publications was 2.034 (Environmental Pollution), and the highest impact factor was obtained from an article published in Nature (30.979) by Dr David Lawlor with Dr Wilmer Tezara and others in 1999 (Nature, Vol. 401, pp 914-917). Dr Tezara, from Venezuela, worked on the physiology of sunflowers with Dr Lawlor in 1996.



David Lawlor and Wilmer Tezara

Rothamsted Research Day

On 4th November 2005, several talks were given highlighting the work being done by younger members of staff at Rothamsted. Topics included mosquitoes, aphids, modelling insect behaviour, sugar beet flowering and wheat genetics.

On display in the Fowden Conference centre were posters from the seven research Divisions, and included three by current or recent Rothamsted International Fellows. The posters were on studies by Carol Moraes on insect chemical attractants, Deying Ma on insecticide resistance and Som Dutt on the production of pharmaceutical compounds from an endangered Himalayan plant species.



Marie Orford (left) and Sorrell Cunningham (right) from Rothamsted International at Research Day

Spotlight on donors:

Rothamsted International Film Club

The Film Club has been operating since October 2002 and regularly shows films with a broad appeal at the Rothamsted Conference Centre. Money raised from the Film Club is donated to the Rothamsted International Fellowship Scheme.

The Film Club meets on the first Friday of each month, with a programme which runs throughout the year divided into two 6-month seasons for winter and summer.

Recent films have included "Ladies in Lavender" and "The China Syndrome".

If you would like to join the Film Club, then please contact Mrs Gill Tattersfield (pictured right). Her email address is gill.tatt@aol.com.

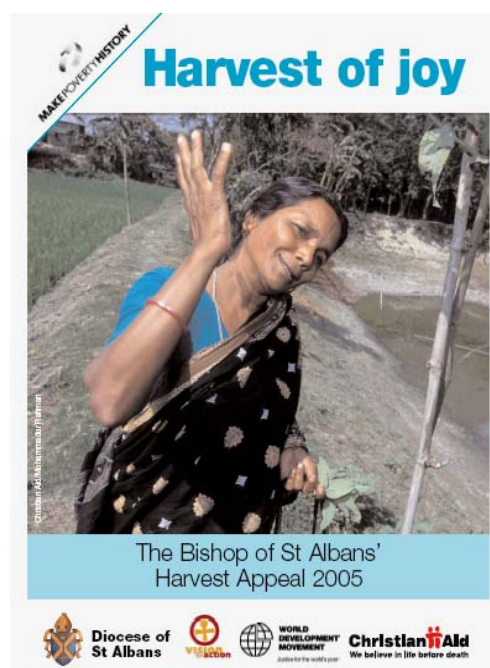


Local links

Two meetings were held in June and August 2005 to try to strengthen interactions between Rothamsted International and local groups in Harpenden and St Albans who may be interested in our work. Brief presentations were made on the Fellowship schemes and international agricultural projects, followed by tours of the laboratory facilities, the Manor and the long-term experiment at Broadbalk on Rothamsted farm.

Groups who attended included the United Nations Association, Churches Together, Save the Children, Oxfam, St Albans Diocese as well as the Mayor of Harpenden.

Rothamsted International has also assisted in writing some of the technical aspects of the Bishop of St Albans Harvest Appeal for 2005, which focused on helping a non-governmental organisation, UBINIG, in Bangladesh (front cover below).



A presentation has been promised by Oxfam (St Albans) for early next year at Rothamsted, to talk about a visit in November 2005 to Mali and Niger, in West Africa, looking at projects for helping pastoralist tribes in the Sahel.

Talks to local societies in 2005

During the past year, we have given six talks on work by Rothamsted International to civil society groups such as Barton-le-Clay Rotary Club, Workers' Educational Association and the University of the Third Age in Hertford.

If you are interested in knowing about what we do, then contact Dr Paresh Shah by emailing him at paresh.shah@bbsrc.ac.uk.