"Plant Doctors" a Global Prescription for Plant Pests

Sarah Wilson
CABI

Plant pests and diseases are on the move, and they are not respecting national borders. CABI's Global Plant Clinic, through its partners and community-based plant clinics, has been helping to map their global spread.

The monitoring and surveillance of plant pests is vital in any effort to improve biosecurity. A current example of the urgent need to track the spread of a plant disease is the emergence of a virulent strain of black stem rust called Ug99. The name for this fungus is derived from the country (Uganda) and year of discovery (1999). This deadly airborne fungus is on the move and poses a serious threat to wheat production around the world. The fungus has already spread to Ethiopia, Kenya, Sudan, Afghanistan, Iran and Yemen, and there are concerns that the Middle East will be next. Efforts are underway to produce wheat resistant to the fungus, but in the meantime tracking its spread is a priority.

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Unlike diseases of humans and animals, there has been no systematic approach to gathering plant pest and disease information on a global scale. The Global Plant Clinic (GPC) has developed an innovative approach to gathering information from some of the hardest to reach farmers in the world. This approach has enabled the GPC to publish 44 new disease records in the past three years. These scientific records are crucial to improving our knowledge of the movement and phytosanitary (plant safety) risks of plant pests.

The GPC approach of using plant health clinics offers a unique opportunity to tap into a vital source of information that traditionally has been difficult to access. The GPC has a very broad reach, with a network of more than 80 regular clinics operating in 10 countries across Africa, Asia and Latin America.

This is how it works: regular plant health clinics take place in local villages or towns, often in the marketplace or other meeting points for farmers. Farmers from the surrounding area can bring a sample of their ailing crop to a "plant doctor" for a diagnosis and practical advice to improve their crop health. If a pest or disease cannot be identified it is referred to a diagnostic laboratory, initially within the country or direct to the GPC. Farmers benefit from improved yields while they provide valuable information on the occurrence of potentially disastrous plant pests and diseases. The direct nature of the clinics speeds the dissemination of findings from the latest research (from scientific researcher to farmer), meaning that the information given is locally applicable and as up-to-date as possible.

Plant health clinics help to maintain international vigilance of pests and diseases. Early studies suggest that each clinic serves

A mobile plant clinic in Butembo, North Kivu, Democratic Republic of Congo. Photographer: Eric Boa

CABI and the Global Plant Clinic

About the Global Plant Clinic

The Global Plant Clinic (GPC) is managed by CABI in alliance with Rothamsted Research and the Food and Environment Research Agency. The GPC provides and coordinates plant health services in Africa, Asia and Latin America. It has an expert diagnostic service for all plants and types of problems, and regularly publishes new disease records.

The GPC trains plant doctors and scientists, establishes plant health clinics and builds plant health systems. We link extension, research and farmers, and work with all sectors to improve regular and reliable access to technical support and advice. Our aim is to create durable plant health services for those who need them most.

The GPC is funded by the UK Department for International Development.

www.globalplantclinic.org
plant.clinic@cabi.org
www.youtube.com/user/globalplantclinic

About CABI

CABI is a not-for-profit science-based development and information organisation with nine centres worldwide. Our mission and direction are influenced by more than 40 member countries that help guide the activities undertaken. These include scientific publishing, development projects and research and microbial services.

Our staff research and find solutions to agricultural and environmental problems. We use science, information and communication tools to help solve issues of global concern. We particularly focus on improving food security and safeguarding the environment. We do this by helping farmers grow more and lose less, combating invasive species, finding natural alternatives to pesticides and improving access to agricultural and environmental scientific knowledge. For more information go to www.cabi.org

A mobile plant clinic in the Cho Gao District, Vietnam. The Vietnamese clinics are run by the Southern Horticultural Research Institute. Photographer: Rob Reeder

around 2000 people (depending on location).

The GPC offers training and support to the plant doctors, giving advice on clinic operation, symptom recognition and how to maintain a quality service. The GPC has trained plant doctors and scientists in some of the poorest countries in the world including Sierra Leone, the Democratic Republic of Congo, Uganda, Rwanda, India, Nepal, Bangladesh, Vietnam, Nicaragua and Bolivia, and is looking to grow plant clinics in more countries.

The GPC works with established organisations within countries – such as government agricultural departments, plant health authorities and extension workers – to establish plant health clinics and build plant health systems that incorporate clinics, diagnostic laboratories, researchers and input suppliers. This method of networking enables the GPC to build on local knowledge and respect local customs while also using the best international advice and support available.

As well as working on the ground with some of the world's poorest farmers, the GPC, based

New Disease Case Study: Leaf and Nut Blight, Tanzania

Mark Sijaona first contacted the GPC around 2003. He was concerned about a new type of disease he and other cashew experts in Tanzania had seen appear several years earlier.

Rob Reeder and Jim Waller visited Mark in 2005 and, with the support of the Agricultural Research Institute in Mtwara, investigated the problem in more detail. Paula Kelly helped to isolate the fungus, which was then identified as a new species of *Cryptosporiopsis*. Mark carried out pathogenicity tests in Tanzania and a new disease record was published in 2006 (Sijaona MER, Reeder RH, Waller JM. Cashew leaf and nut blight – A new disease of cashew in Tanzania caused by *Cryptosporiopsis* spp. *Plant Pathology* 2006, **55**, 576).

But GPC assistance did not stop there. Drs Reeder and Waller continued to ponder over the identity of the fungus. Molecular data obtained after the publication of the new disease record showed that the fungus belongs to a new genus. We are still investigating how it is related to *Cryptosporiopsis* and allied genera, and plan to publish our findings.

The GPC received another cashew enquiry from the Caribbean in 2007, which on further investigation proved to be exactly the same fungus and disease found in Tanzania.

Linking the discovery of a new disease in widely separated regions is not uncommon in human and animal diseases, where diagnostic laboratories and health services are better equipped to share information. Connecting and confirming the discovery of a new cashew disease from the Caribbean with one reported from Tanzania is more difficult.

The GPC plays an important role in assisting plant disease vigilance around the world, not only for cashew but for many other crops that are valuable to farmers and trade in the South.

A cashew nut lesion.

From Boa E and Reeder R (compilers), *New Disease Records from the Global Plant Clinic*, CABI, Rothamsted Research and Food & Environment Research Agency, Edition 2, March 2009. Reprinted with permission.

in the UK, runs a global diagnostic service that is authorised to receive diseased crop samples from any country in the world. There is no such service in Australia or the US.

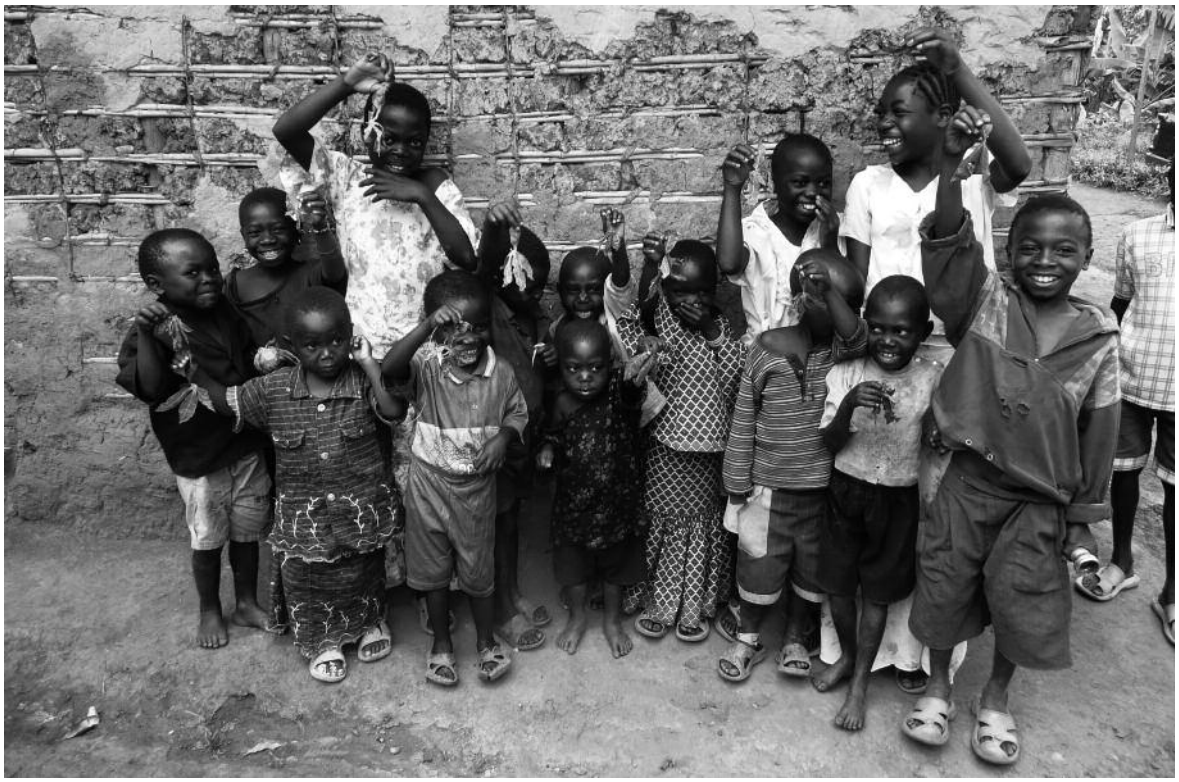
Diagnosis of a plant health problem is usually made on the spot at the mobile plant clinic, but if the plant doctor is unable to diagnose the problem, GPC headquarters can be contacted to provide support. Sometimes a health problem that is unfamiliar at the local level will turn out to be a new disease record for that country. As the name suggests, new disease records mark the occurrence of a pest or disease that has not previously been reported from that geographic region. These can be well-known pests and diseases, or those that are new to science.

New disease records have been identified from farmers' queries and by GPC partners. The GPC offers a means of confirming pests and diseases through its own facilities and links to affiliated organisations at the national and international level. All new disease records are published as peer-reviewed scientific papers and appear in two well-respected journals: *Plant Pathology* (UK) and *Plant Disease* (US).

The GPC is a leading international centre for publishing new disease records because of its unique combination of diagnostic expertise across all major pathogen groups, wide knowledge of crops and ability to accept plant disease samples from around the world.

Many diseases are not being accurately recorded, and the GPC expects to publish more new disease records as more clinics start and wider use is made of expertise that is not available in-country. GPC assistance does not end with identification of pathogens and diagnosis. The GPC also offers advice on how to manage pest and disease problems, and assists with the writing and submitting of papers for publication.

Through establishing a broader network of partners in more countries, CABI, through the GPC, will continue to mitigate the risks posed by plant pests and diseases. The important information collected through the GPC network provides crucial data that is being used to build a picture of the global spread of plant pests and diseases, while assisting those farmers on the ground who need help the most to manage their plant health problems.



Children holding leaves in Butembo, North Kivu, Democratic Republic of Congo. Photographer: Eric Boa