PlantWise: A Global Plant Health Alliance

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www.cabi.org

KNOWLEDGE FOR LIFE
The World Today

- Against a background of
  - ~1.02 billion people going hungry
  - 13,000 children under 5yr dying each day through malnutrition

- Up to 40% of the food we grow is lost to pests and diseases
- Reducing this to 39% could feed up to 25m more per day
In the future: maelstrom vs. vacuum?

Increased pressure on food production from:

- Trade and travel; Climate change; Water & energy scarcity; Population increases….*leading to*:

- John Beddington’s “Perfect Storm”…..*meanwhile*:

- “Insect vectors, pests and diseases are moving extremely fast and we have frankly no grip whatsoever over what they might do in the next 20/30 years.”

  Janice Jiggins, Wageningen University
Pest and disease threats: simple insights

Food & economic security

- 19% of the world's wheat, which provides food for 1 billion people in Asia and Africa, is in imminent danger from Ug99 (wheat rust).

- Rice is a staple for about half the world's population, but we lose 10%-30% of the crop to blast disease

- Stem damage diseases to banana and plantain crops could cause losses of up to $4Bn in 2010

Farmers are simply seeking solutions

Researchers are “simply” seeking distribution data, linked to ground-based evidence
Member country commitment to KM: “Make something happen”
Users want agri-info organised

- But, pest data has problems -
  - Dispersed/uncoordinated, poorly-maintained, non-specific in nature, of variable quality, and very general geo details
- Hugely expensive time investment
- No means of evaluating risk – human, $, R&D ROI
- SPS legislative information is poorly maintained
- Give me
  - a single site I can trust
  - current and interrogative data
  - timely and accurate pest risk assessments
  - predictive alerts – what is likely to happen, and when
What is required? User feedback

- Time saving
- Where are the pests now?
- Where are they going?
- Granularity
- Evidence/references - trust
- Accurate quarantine info
- Images – but structured
- Diagnostic expertise, quality-assured
- Risk quantification
- Consolidated & holistic info
- History
- Multiple platforms
- Reliable analysis on tap
- Networked experts
- Assessments, triage & policy advice
Our vision

**Plant doctors**

Develop a plant health resource for all capable of supplying an early warning surveillance system for plant health

**Top-Down: Informing the Farmer**

Working with an alliance of partners, provide knowledge at locally run plant clinics in the developing world and internationally through a comprehensive plant health resource

**CABI data**

**Bottom-Up: Utilise local Observations**

Real-time distribution and reportage

**International data from partners**
Our Vision

- reduced **losses**
- increased **income**
- improved **livelihoods**
- improved **food security**

Developing country farmers

Plant clinic network and diagnostics

- local pest intelligence
- global intelligence

Knowledge bank

- advice
- pest intelligence

Upscale plant clinic programme to 400+ clinics in 40+ countries

Governments, scientists and corporates

- local, national and global intelligence

Our Vision

- reduced **losses**
- increased **income**
- improved **livelihoods**
- improved **food security**

Knowledge bank

- improved **vigilance**
- improved **pest risk analysis**
- improved **product development**
- improved **food security**

Local pest intelligence

Global Plant Clinic / CABI staff / partner organisations

CPC / CAB Abstracts / Maps / FAO / IPPC / EPPO / ...
Welcome to version 0.1 of the Plantwise knowledge base – the resource designed to answer important questions relating to plant pest and disease occurrence worldwide. With distribution data on over 3,000 pests and diseases, and related geographical data such as climate and soil, Plantwise helps you to make scientifically-informed decision about crops, management, and pest risk.

Beta v 0.2 in progress- updates include addition of FARA data, and severity level indicators in map tool. Click here for details and to feedback.
Building a centralised plant health resource

- Detailed information on 2,500 diseases, pests and crops
- 28,000 additional reports
- 6,000 images
- 1700 distribution maps
- Data from 8m CAB Abstracts
- Plus, critically:
  - Geo-specific observations (Clinics)
  - Authoritative partner content

“The benefit to Australia from using The Crop Protection Compendium is up to $1.4m per year.”

Peter Core, Director, ACIAR
Making this more than CABI, or the Crop Protection Compendium

<table>
<thead>
<tr>
<th></th>
<th>Govt, NPPO, Regulatory</th>
<th>Commercial: Chemical/food supply</th>
<th>Commercial: Risk analysis/insurance</th>
<th>Farmers &amp; Extension</th>
<th>Academic</th>
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<td>Pest distribution data</td>
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<td>GIS granularity</td>
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<td>Verification: rate of incidence</td>
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Free clinics are set up at local meeting places such as markets.

Farmers bring a sample into the plant clinic.

They receive a ‘prescription’ from the plant doctor.

Doctors are trained: surveillance and diagnostic techniques, IPM, technology development, pesticide use and reduction, markets, government policy, risk reduction, marketing, business skills and post-harvest care.
Information and Knowledge Management thru on the ground Training
• Bolivia
• Bangladesh
• Congo
• Perú
• Nicaragua
• Vietnam
• Sierra Leone
Root knot nematode on tomato

**Attack below, damage above**
Tomato roots are attacked by nematodes, reducing growth of the plant and yield. The symptoms above ground are similar to other diseases. Confirm nematode attack by examining the roots.

**How the plant is affected**
Nematodes or Jantu Aula are small worms which live in the soil, and cannot be seen with the naked eye. They can persist for many years, even after the infected plant has been removed. Nursery soil is a common source of nematodes.

How to recognize tomato nematode:
- distinctive swellings or knots on the roots
- the plant is stunted (it cannot absorb enough food)
- leaves go yellow and die

Nematodes attack many plants. Knots are often confused with nodules found on the roots of crops such as cowpea and bean. These nodules help the plant to grow.

**Management**
_Pseudomonas fluorescens_ is a natural control method. Su-Mox is one example of a commercial preparation. When applied to the soil it helps tomato plants fight nematodes. Treat nursery soil to prevent transfer of nematodes to fields.

- In the nursery apply Su-Mox at 50 grams per square metre of soil.
- In case of infested seedlings, broadcast the field with well decomposed farmyard manure (1 ton per acre) enriched by Su-Mox at 2 kilograms per 100 kilograms of farmyard manure. Apply this treatment before you transplant the seedlings.
- Intercrop every 25 rows of tomato with one row of maniogold. Their root juices kill nematodes.
- Ensure good drainage after irrigation by keeping the ridge height of the seedling bed up to 8-10 inches.
- Do not plant tomatoes continuously. Rotate every six months with fodder crops such as sorghum which are not attacked by nematodes.

Chemical control of nematodes in the soil is available but expensive.

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Yellow stem borer on paddy

**Number one enemy**
Yellow stem borer is the most damaging insect on paddy. It feeds inside the plant. Stems become dry and hollow and no grains are produced. The dried stems can be pulled out easily and are called dead hearts. The empty grains are known as white ears and detach easily.

**Insect damage**
The insect has two different forms. The adult insect is usually a yellowish moth with a black dot on each wing and has a pointed mouth. The adults visit the fields in the evening. The young larvae or worms are found inside the stem and are off white with a red head and no visible legs.

The larva is thin with a rough surface and looks like a small tube. They cause much damage by boring into the stem and eating the plant. Only one larva is found in each stem although several stems can be affected.

**Management**
There are no resistant varieties of rice and chemical sprays are not effective once the larvae are hidden inside the stem.

Early treatment of young plants helps to reduce damage in fields. In raised beds of seedlings spread Carteb/HCL 10G evenly. This is an approved granular insecticide that dissolves in water and remains within the plant. A raised bed of one foot by 10 feet will need around 13 grams of Carteb/HCL 10G.

After transplanting seedlings, and within 10 days, place pheromone dispensers containing sex pheromone tablets in the paddy field. These will attract adult moths and reduce populations of larvae. Place 32 dispensers per acre, evenly spaced. These should remain in the field till harvest. There is no need to replace the tablets during this time.
# Clinic programme progress

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<th>New countries</th>
<th>Status</th>
<th>Existing schemes</th>
<th>Status</th>
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<td>Kenya</td>
<td>Workshop Kick-off; Kitali pilot</td>
<td>Sierra Leone</td>
<td>12 regional &amp; 50 satellite clinics</td>
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<td>Pakistan</td>
<td>Workshop July</td>
<td>Bangladesh</td>
<td>New impact study</td>
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<td>Peru</td>
<td>NPPO likely to resource</td>
<td>Uganda</td>
<td>Official Govt policy adoption</td>
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<tr>
<td>Rwanda</td>
<td>Set up planned September 2010</td>
<td>Vietnam</td>
<td>Plan to expand to 5 clinics</td>
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<tr>
<td>Sri Lanka</td>
<td>3rd clinic commenced with partner</td>
<td>India</td>
<td>Partner impact study; pilot w/ Karnataka State Dept Agriculture</td>
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<tr>
<td>(Afghanistan)</td>
<td>Aga Khan possible funding</td>
<td>Bolivia</td>
<td>Expansion planning September</td>
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<tr>
<td>China</td>
<td>Joint Pilot proposed w/ NATESC, Hainan Province</td>
<td>Nicaragua</td>
<td>Expansion planning August</td>
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Clinics have broad reach….
Bolivia (Feb 00 – April 09)

Average of 11.5 queries per clinic session

<table>
<thead>
<tr>
<th>Clinics</th>
<th>Sessions</th>
<th>Users</th>
<th>Queries</th>
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<tbody>
<tr>
<td>10</td>
<td>801</td>
<td>6815</td>
<td>9195</td>
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Faustino Benavides
Began spraying the right pesticides more accurately and his tomato harvest increased by 25%.

... and significant impact
Bolivian tomato farmers

- Adoption rate = 88%
- Input cost reduction = 34%
- Yield increase = 142%
- Income growth = 100X (+ $4/day)
Global surveillance: data gathering points 2010 to 2014

- Currently 9 countries, 80 clinics
- Building to 40 country schemes
- 10+ clinics/country
- >400 clinics feeding plant pest geo-positioned observations

Rich insight into what’s happening where
Work with us: Give us....

- Your feedback
- Your input and ideas
- Your recommended content/partnerships

All are vital to help us make this initiative a reality

Lose Less – Feed More
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