CASE STUDY:
CAB Abstracts on CAB Direct
Panama disease of bananas

**CAB Abstracts** is the most complete applied life sciences literature database in the world. Its coverage includes agriculture, environment, veterinary sciences, applied economics, food science and nutrition.

CABI’s online database platform, **CAB Direct**, has been built specifically for researchers working in the applied life sciences to help them use CAB Abstracts to research complex problems quickly and with precision.
Panama disease of bananas

In the 1950s, Panama disease virtually destroyed the banana crop worldwide. Plantations were replanted with Cavendish bananas which were resistant to the disease. A new strain of Panama disease, Tropical Race 4 or TR4, has emerged which Cavendish bananas are susceptible to. TR4 is destroying banana plantations in Southeast Asia and has spread to Northern Australia, the Middle East and Africa.

No single method of controlling TR4 has been identified and the global supply of bananas is once again under threat.

**CAB Abstracts** is the most comprehensive database of applied life sciences literature in the world. CAB Direct is the only online platform built specifically to help researchers maximise the potential of CAB Abstracts.

On **CAB Direct**, CAB Abstracts can help researchers understand the scale of the problem and identify potential methods or combinations of methods for managing Panama disease, particularly strain TR4.

The screenshots in this case study show CAB Abstracts in use on the CAB Direct platform.
CAB Abstracts contains over 8.2 million records providing access to the world’s applied life sciences literature.
Searching CAB Abstracts for the phrase “Panama disease” gives us some results, and the information you require to develop the search.

On CAB Direct, the results page has been designed to make searching for relevance fast and simple.
To make searching really powerful, CAB Abstracts is indexed using the CAB Thesaurus, the largest and most comprehensive controlled vocabulary in the applied life sciences.

CAB Direct uses a new visual interface so we can quickly see which terms are most commonly used, and easily identify and refine by the correct organism descriptions for Panama disease.
Now that we have a search strategy developing and a set of results to work with, we can use the *My Projects* feature on CAB Direct to save and organise our searches and results.

It’s quick and simple to sign-up for a *My CABI* account and with this we can save searches and records, create and work on projects, highlight records and add annotations as well.
We can now go back to the search results, develop the search strategy and save searches to the project.
The edit search function is an easy way to remove the informal search phrase “Panama disease”, so that we use only the correct organism names. This gives us many more results to work with.
We can use the interactive date chart to restrict the results to recently published articles, in this case articles published in 2015.

And we can select interesting records and save them to the project too.
In CAB Abstracts on CAB Direct, we can highlight significant passages of text.

Here we see that CAB Abstracts covers research that examines the scale of the problem, its potential economic impact and methods for detecting it.


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Abstract:
Banana (Musa spp.) is an important cash and food crop in the tropics and sub-tropics. Fusarium wilt, which is also known as Panama disease, is caused by Fusarium oxysporum f. sp. cubense (Foc). It is one of the most destructive diseases of this crop, and has a relatively wide host range. Its greatest impact was on the early ‘Gros Michel’-based export trades. Resistant cultivars of the Cavendish subgroup were used to replace ‘Gros Michel’ but are now succumbing to a new variant of the pathogen, tropical race 4 (TR4). Although TR4 is only found in the Eastern Hemisphere, it threatens global export and small-holder production of the Cavendish cultivars. Management of this disease is largely restricted to excluding the pathogen from non-infested areas and the use of resistant cultivars where Foc is established. The perennial production of this crop and the polycyclic nature of this disease hinder the development of other management strategies. Measures that are effective against annual or short-lived hosts of these diseases are usually ineffective against Fusarium wilt of banana. Effective biological, chemical and cultural measures are not available, despite a substantial, positive literature on these topics. Critical evaluations of, and realistic expectations for, these measures are needed. Better resistance is needed to this disease, especially that is caused by TR4.
In CAB Direct we can organise our data by using different colours to highlight different parts of the abstract, for example the research objective and the results.

**Potential economic impact of Panama disease (tropical race 4) on the Australian banana industry.**

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**ISSN:** 1861-3829

**URL:** [http://www.jpdp-online.com](http://www.jpdp-online.com)

**Record Number:** 20163017915

**Abstract:**

Panama disease, caused by *Fusarium oxysporum* f. sp. cubense tropical race 4, is considered to be one of the most severe threats facing the banana industry worldwide. Tropical race 4 has rapidly spread throughout Southeast Asia since first being reported from Taiwan in 1990 and Indonesia in 1992. It was first discovered in Australia in 1997 where strict quarantine management contained its distribution to the Northern Territory for almost two decades until March 2015 when it was detected in Tully, North Queensland. The spread of this disease to the major banana production areas in Queensland could have a severe impact on the Australian banana industry as no effective chemical control options exist and no resistance has as yet been identified in agronomically acceptable banana varieties. However, given its successful containment in the Northern Territory there is uncertainty about future losses, and consequently what resources should be expended on its continued control. In this paper, we construct a dynamic model to estimate potential financial consequences for the Australia banana industry over time if the disease spreads beyond its current distribution. Scenarios modelled account for the possibility of spread via natural means described by a diffusion-like process, and also by large jumps mediated by human activities. Aggregating results of likely spread over time, we predict the disease will cause industry losses exceeding $138 million per year despite a slow rate of spread.

**Publisher:** Eugen Ulmer KG
The abstract below describes a sensitive, specific and rapid detection method (real time PCR) for determining infection – the first step for preventing disease spread and implementing control measures.

With CAB Direct we can create our own notes, by annotating records, to add context and meaning.
With CAB Abstracts on CAB Direct, you can easily extend your query. Using the Topics function, research into control methods can be found in CAB Abstracts.
The results show that an endophyte is one of the methods of control in the research literature.
Results include an article suggesting that the endophytes have shown positive results.

**In planta** biocontrol of soilborne *Fusarium* wilt of banana through a plant endophytic bacterium, *Burkholderia cenocepacia* 869T2.

**Abstract:**
Aim: Fusarium wilt (Panama disease) caused by *Fusarium oxysporum f. sp. cubense* tropical race 4 (Foc TR4) is a soilborne disease that severely devastates the banana industry worldwide. We aimed to isolate beneficial endophytic bacterial strains against Panama disease. Methods: From different plant species, including reeds (*Phragmites australis*), vetiver grass (*Chrysopogon zizanioides*), and banana plants (Cavendish cv. Pel-Chiao, Cavendish cv. Formosana, and Musa sapientum cv. Rose), endophytes were screened and characterized. The diversity and community of endophytes within banana plants were analyzed by PCR-denaturing gradient gel electrophoresis (DGGE). The banana tissue culture plantlets were inoculated with the candidate endophyte, *Burkholderia cenocepacia* 869T2, and effects of *in planta* biocontrol were observed. Results: *Endophytic* B. *cenocepacia* 869T2 decreased the disease incidence of *Fusarium* wilt on treated banana plants to 3.4%, comparing to 24.5% of non-inoculated plants infected in the field test within a 7-month period. Furthermore, significant growth promoting of 869T2 inoculated banana plants was observed in field experiments. Conclusions: In addition to 869T2 genomic sequence data, our results suggest that the pyrrolquinoline quinone potential producer, B. *cenocepacia* 869T2, is a good biological control agent (BCA) for use in the biocontrol of *Fusarium* wilt and plant promotion.
We can use CAB Direct to create a new search based on the index terms from the previous record.

By simply adding an additional keyword, CAB Abstracts can be used to look for other relevant research into endophytes that could provide additional insights, in this case, mycotoxins.
We find evidence that mycotoxin accumulation can be inhibited when used against a different Fusarium species.
However, the research shows that there may be potential risks, and CAB Abstracts covers research that examines the risks of introducing invasive endophytes too.
My Projects on CAB Direct not only gives you an efficient way to group and manage your work, it also automatically generates an exportable log of your activities on the project.

This gives you a quick and simple way to track and report on what you have been working on.
CAB Abstracts on CAB Direct combines sophisticated search capabilities with useful features like My Projects, highlighting and annotating, in a clear and easy to use interface.

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www.cabi.org/cabababstracts

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