

# Track and Trace in plant disease outbreaks



Naktuinbouw applies advanced molecular techniques to generate DNA fingerprints of individual isolates of plant pathogens. This identification power has proved to be indispensable to track and trace connections between different plant disease outbreaks and can eventually lead to the source of an infection.



## Disease outbreaks

Plant pathogens can infect crops causing serious damage and losses of harvest. The need to detect a pathogen in an early stage is high in order to minimize the magnitude of the outbreak and the risk of dispersal to different areas. Naktuinbouw is an expert on detection of a large number of plant pathogens in many crops and develops new detection tests whenever new diseases are established. There are many ways to detect a plant pathogen. However, not all questions are answered by knowing what pathogen **species** caused the damage in your field or greenhouse. We would like to go a step further and identify the **isolate** or **type** of the pathogen responsible for the damage. With this knowledge connections between outbreaks can be made and finally the source of an infection can possibly be found.



## Questions

Naktuinbouw has the ambition to answer the following questions:

- has an outbreak any relation to an other outbreak somewhere else in the world?
- is an outbreak the result of remaining inoculum?
- is it possible to trace the source of an outbreak?

## Concept

Naktuinbouw is an independent organisation which combines the possibilities of DNA fingerprinting techniques and the background knowledge on plant pathogens. The combination of - and synergy between - these elements guarantees extremely sound analyses and provides important information to unravel possible relations between different outbreaks and can eventually lead to the source of an infection.

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## DNA analysis

To identify pathogens on the isolate level, DNA fingerprints are generated and analysed. Naktuinbouw mainly uses the AFLP<sup>®</sup> (Amplified Fragment Length Polymorphism) technique, developed by Keygene N.V. This technique is not only applicable to all crops in Naktuinbouw's working domain but to all living material which contains DNA, therefore also plant pathogens can be examined using this technique. That gives maximum flexibility.

## Prerequisites

There are two prerequisites to use DNA fingerprinting for Track and Trace purposes:

- The genetic variation in a species (between the different isolates from different origin) should be considerably high.
- The different isolates should be genetically stable (in time).

## Databases

All DNA fingerprints generated by Naktuinbouw are collected in databases. New profiles can be added and can simply be compared to all profiles already present in the database.

## Joining of knowledge

Comparing DNA fingerprints of the isolates might identify identical isolates found at different locations. It can be postulated that these will have the same origin. Background information on trade and connections between companies, the varieties that are grown, etc. are very important. This information is present at Naktuinbouw Inspections and is shared with the Netherlands Plant Protection Service. It is the combination of this background information together with the DNA fingerprints information that makes tracing possible.

## More information?

Would you like more information about the possibilities of Track and Trace of plant pathogens? Please contact Hedwich Teunissen (DNA research), telephone +31 (0) 71 332 62 51, e-mail: [h.teunissen@naktuinbouw.nl](mailto:h.teunissen@naktuinbouw.nl)