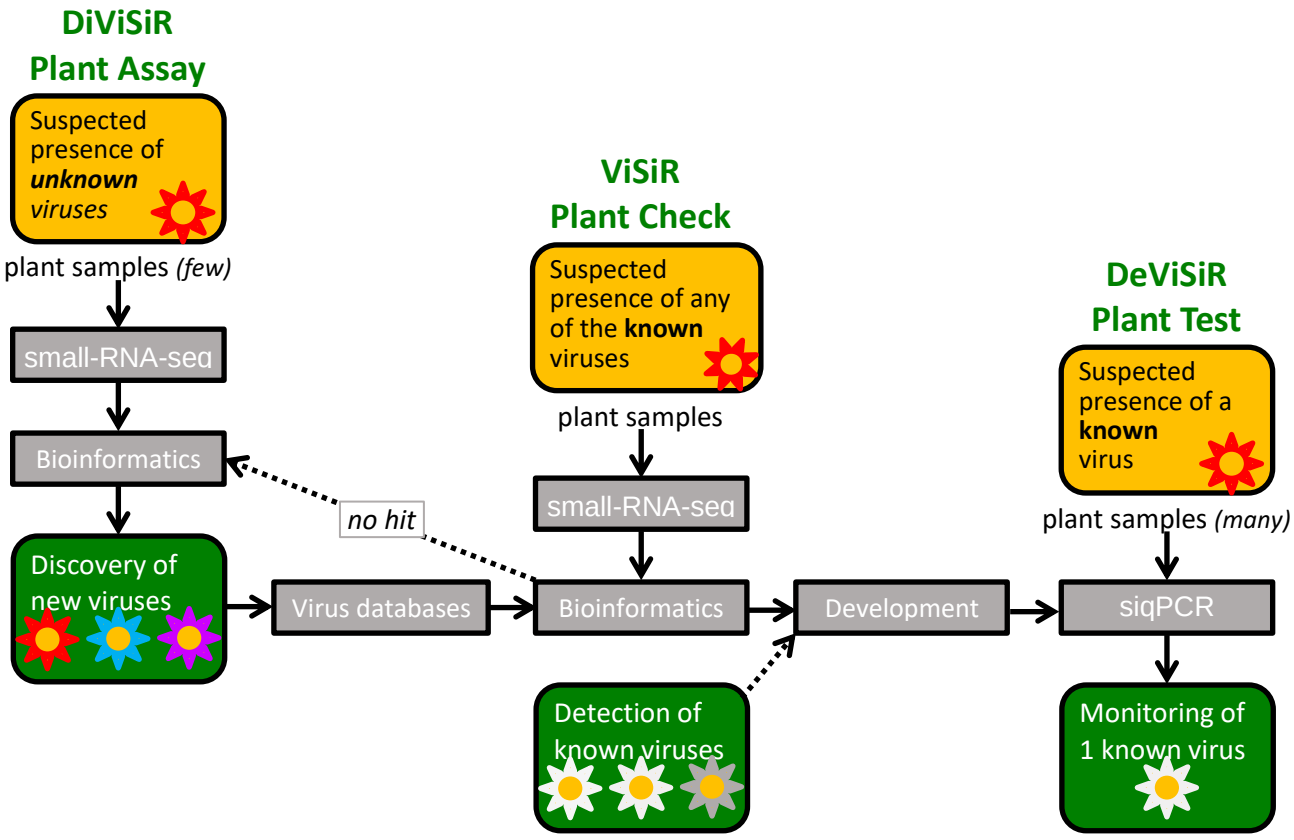
ViSiR innovative tools for plant virus diagnostics



Dutch Genomics Service & Support Provider
Swammerdam Institute for Life Sciences
Faculty of Science
University of Amsterdam

ViSiR Plant Check

Purpose

Sometimes commercial plants harbor unwanted viruses. For many plant-breeding companies early and accurate detection of viruses in their breeding material is essential. Although several plant-virus detection methods, such as ELISA, are available, each of them has its own limitations. A major drawback is that one needs to know which virus is present in order to use the correct test and each virus requires a specific test. Another drawback is the fact that many detection methods identify the virus particles itself, whereas many viruses can “hide” themselves quite effectively. An easy method to detect the presence of *any* known virus *anywhere* in a plant would be very handy.

siRNA

Silencing-RNAs (siRNAs) are small RNA molecules of 21-24 nucleotides that are abundantly present in plant cells. siRNA has recently been recognized as pivotal in the immune response of plants to virus infection. An important aspect of the siRNA response is that it spreads throughout the whole plant, even if the virus is contained to one tissue. This allows for virus detection using any part of the plant.

ViSiR Plant Check

The virus siRNA (ViSiR) Plant Check is a method based on massive parallel sequencing of small-RNA in combination with plant virus and viroid NCBI-based databases plus smart bioinformatics. It will identify any known virus and/or viroid originating siRNAs in plant tissue samples and indicates which known viruses and/or viroids the plant has been in contact with. Once viruse and/or viroid siRNAs are detected, they can be monitored individually by our qPCR-based DeViSiR Plant test. In case of suspected virus infection, but no match with any known virus in the database, the DiViSiR Plant Assay can be performed to discover yet unknown viruses.

Application

If you have a plant that possibly contains a virus or viroid, ViSiR Plant Check provides a convenient and affordable way to check if and which known virus or viroid is present. As many viruses and viroid infect plants without any visible characteristics, ViSiR Plant Check can also be used to routinely check important plant-breeding material for virus and/or viroid contamination.

Samples

In principle you could use any part of a plant for the ViSiR Plant Check, however in practice, usually fresh leaf material is being used. Only a small piece of leaf per plant is needed. In order to keep ViSiR Plant Check affordable, checks need to be performed in multiples of 8-12 samples.

Information

ViSiR Plant Check is developed and executed by the MAD: Dutch Genome Service & Support Provider @ the University of Amsterdam (www.dutchgenomics.nl) in collaboration with Naktuinbouw and financially supported by EFRO program “Kansen voor West II”.

DeViSiR Plant Tests

Purpose

Sometimes commercial plants harbor unwanted viruses. For many plant-breeding companies early and accurate detection of viruses in their breeding material is essential. Although several plant-virus detection methods, such as ELISA, are available, each of them has its own limitations. A major drawback is the fact that many detection methods identify the virus itself and many viruses can "hide" themselves quite effectively. An easy method to detect the presence of a specific virus *anywhere* in a plant would be very handy.

siRNA

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Available DeViSiR Plant Test

Dedicated virus siRNA (DeViSiR) Plant Tests are qPCR-based tests for the detection of siRNA of specific viruses or viroids. DeViSiR Plant Tests are specific, sensitive and affordable, and only require a standard qPCR set-up.

Depending on the involved virus or viroid, we offer several options to acquire a DeViSiR Plant Test:

Virus	Discovery[1]	Development	Validation	DeViSiR test	Service @ MAD	In-house @ Company[2]
Unknown	Required	Required	Optional	**NEW**	Available	Possible
Known	-	Required	Optional	**NEW**	Available	Possible
Known	-	-	-	**Existing**	Available	Possible

[1] *Will involve DiViSiR Plant Assay*

[2] *You can acquire the desired DeViSiR Plant Test and perform the test yourselves in-house.*

Discovery of unknown virus sequences

In case the virus is unknown, the process has to start with a discovery phase, the DiViSiR Plant Assay, which involves next-generation small-RNA-seq, similar as in ViSiR Plant Check. In the DiViSiR Plant Assay, virus related siRNAs will be identified and virus sequences will be derived from them.

Development of custom DeViSiR Plant Test

In case the virus and its genome sequence are known, or has been discovered via the DiViSiR Plant Assay, the development phase will be dedicated to identify target siRNA sequences. From these target siRNAs, a new DeViSiR Plant Test will be created.

Validation custom DeViSiR Plant Test

If desired, a new DeViSiR Plant Test could be validated for sensitivity, specificity and reproducibility.

Green Innovation Cluster draagt bij aan de versterking van de concurrentiepositie van de tuinbouw in de regio door het omzetten van kennis in concrete innovaties.

G4P4 Kansen voor West II

Provincie Noord-Holland

Dit project wordt mede mogelijk gemaakt door het Europees Fonds voor Regionale Ontwikkeling van de Europese Unie en een bijdrage van de provincie Noord-Holland.

Existing DeViSiR Plant Tests

DeViSiR Plant tests will become increasingly available for known viruses. Please do inquire if this is the case for your virus of choice.

Service

We offer the unique opportunity to perform DeViSiR Plant tests in your own lab. For this, we share our target sequences with you. Together with a standard qPCR set-up plus a commercial plant siRNA-qPCR kit, you are good to go.

In case you do not possess a qPCR set-up, the MAD offers to execute DeViSiR Plant tests for you at affordable rates.

Information

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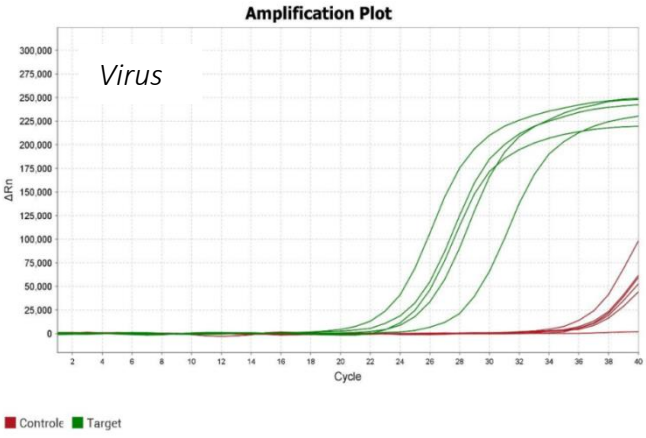

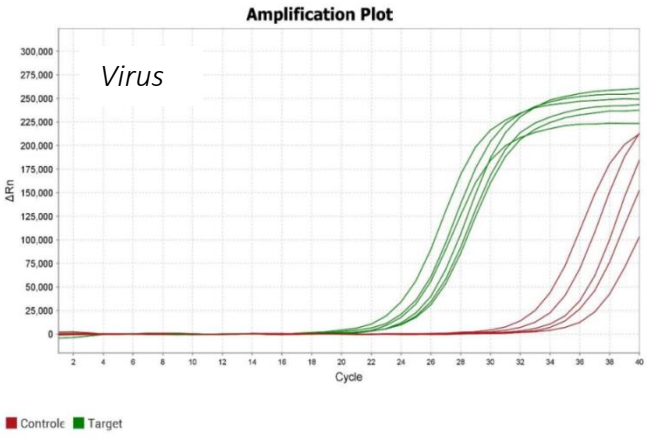

Examples of DeViSiR Plant Tests

DiViSiR Plant Assay

Purpose

Sometimes commercial plants harbor unwanted viruses. For many plant-breeding companies early and accurate detection of viruses in their breeding material is essential. Although several plant-virus detection methods, such as ELISA, are available, each of them has its own limitations. A major drawback is that one needs to know which virus is present in order to use the correct test and each virus requires a specific test. Another drawback is the fact that many detection methods identify the virus particles itself, whereas many viruses can “hide” themselves quite effectively. But the most important drawback is that you can only test for *known* viruses. An easy method to discover and identify *unknown* plant viruses would be very handy.

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DiViSiR Plant Assay

The Discovery Virus siRNA (DiViSiR) Plant Assay is a method based on massive parallel sequencing of small-RNA in combination with smart bioinformatics. It will discover any unknown virus and/or viroid originating siRNAs in plant tissue samples and identify which yet unknown viruses and/or viroids the plant has been in contact with. Once virus and/or viroid siRNAs are detected, they can be checked for by adding them to our ViSiR Plant Check or monitored by our qPCR-based DeViSiR Plant test.

Application

If you have a plant that possibly contains a virus or viroid, DiViSiR Plant Assay provides a convenient and affordable way to discover which *unknown* virus or viroid may be present. It will render derived genome sequences of discovered viruses or viroids, which can be used for other purposes and tests.

Samples

In principle you could use any part of a plant for the DiViSiR Plant Assay, however in practice, usually fresh leaf material is being used. Only a small piece of leaf per plant is needed. Usually only a small number of infected and non-infected plant samples are required for a DiViSiR Plant Assay.

Information

DiViSiR Plant Assay is developed and executed by the MAD: Dutch Genome Service & Support Provider @ the University of Amsterdam (www.dutchgenomics.nl) in collaboration with Naktuinbouw and financially supported by EFRO program “Kansen voor West II”.

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