Platforms for the detection of plant diseases and -pests

Reliable diagnostics for the early detection of plant diseases and pests is the basis of the cultivation of healthy crops and trade in disease-free products. Wageningen University & Research develops, manufactures and implements diagnostic tests and products for the detection, monitoring and prevention of plant diseases. See the overview of the various platforms that can be used to detect these organisms, depending on the question.

Bacteria
- LAMP
- TaqMan-PCR
- DAS-ELISA
- Electron Microscopy (EM)
- Luminex
- Next Generation Sequencing (NGS)
- Modern Vision Techniques

Viroids
- LAMP
- TaqMan-PCR
- Luminex
- Next Generation Sequencing (NGS)

Insects
- LAMP
- TaqMan-PCR
- Luminex
- Next Generation Sequencing (NGS)

Viruses
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Phytoplasmas
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Nematodes
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Fungi
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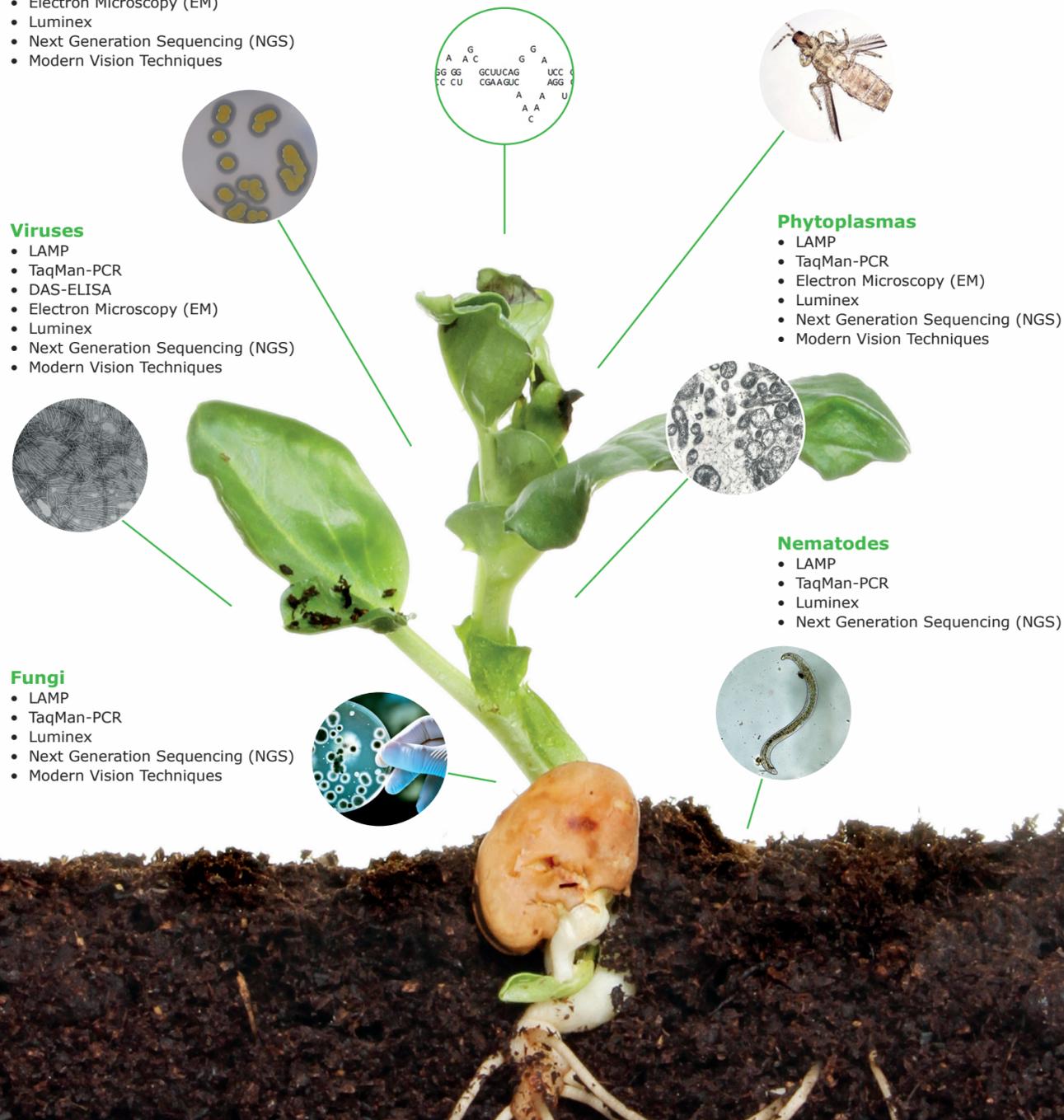
LAMP

Speed	●●●
Location	At location (in the greenhouse, in the field, in the harbour, at the airport)
Specificity	●●●
Sensitivity	●●●
Number of pathogens per sample	1 to 2
Number of samples per test	8-16
Qualitative/ quantitative	Semi-quantitative
Costs	●●
Added value of this platform	8-16 At location (On-site); no DNA extraction; fast; immediate result

TaqMan-PCR

Speed	●●
Location	In the laboratory
Specificity	●●●
Sensitivity	●●●
Number of pathogens per sample	1-4
Number of samples per test	1-96
Qualitative/ quantitative	Quantitative
Costs	●●
Added value of this platform	Quantitative, multiplex

DAS-ELISA

Speed	●●
Location	In the laboratory
Specificity	●●
Sensitivity	●●
Number of pathogens per sample	1
Number of samples per test	1-1000s
Qualitative/ quantitative	Qualitative
Costs	●
Added value of this platform	Automation (robots and / or high-throughput) possible, widely applicable

Electron Microscopy (EM)

Speed	●●
Location	In the laboratory
Specificity	●●
Sensitivity	●
Number of pathogens per sample	Does not apply, to distinguish groups
Number of samples per test	1
Qualitative/ quantitative	Qualitative
Costs	●●●
Added value of this platform	Visual

Luminex

Speed	●●
Location	In the laboratory
Specificity	●●
Sensitivity	●●●
Number of pathogens per sample	Several pathogens per sample (1-96)
Number of samples per test	1-96
Qualitative/ quantitative	Semi-quantitative
Costs	●●
Added value of this platform	Automation (robots and / or high-throughput) possible, multiplex (=job saving), expandable

Next Generation Sequencing (NGS)

Speed	●●
Location	In the laboratory
Specificity	●●●
Sensitivity	●●
Number of pathogens per sample	Infinite
Number of samples per test	1-24
Qualitative/ quantitative	Quantitative
Costs	●●●
Added value of this platform	Known and unknown pathogens; track and trace

Modern Vision Techniques

Speed	●●●
Location	In the laboratory (now); in the greenhouse / field (future)
Specificity	●●●
Sensitivity	● - ●●● (dependent on pathogen)
Number of pathogens per sample	Not applicable
Number of samples per test	1
Qualitative/ quantitative	Qualitative
Costs	●
Added value of this platform	Non-invasive; stress as indicator of diseases; high throughput screening of plants possible

More information?
www.wur.eu/plantdiagnostics

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