

National Plant Diagnostic Network Virus Diagnostics workshop

Summary Table

- Biological indexing - Plant host range & transmission
- Light microscopy
- Electron microscopy
 - TEM
 - ISEM
- Serology-based assays
 - ELISA
 - ImmunoStrips
- Nucleic acid-based analysis
 - PCR, RT-PCR, LAMP
 - Real-time PCR
 - NASH and Microarrays
 - Next generation sequencing

Table. Comparison of some of the major diagnostic tools and techniques for the detection of plant viruses. The number of + symbols indicates how methods rate regarding each considered criterion, from acceptable (+) to optimum (+++++).

Technique	Abs or	Sensitivity	Specificity	Feasibility	Rapidness	Equip	HTP	Cost	Value
	Seq Info								
Bioassay	No	++++	+	+++	+	+++	+	+++	+
Light microscopy	No	++	++	++	+++	+++	+	+++	++
EM (TEM)	No	+	+	+++	+++	+++	++	++	++
EM (ISEM)	Yes	++	++	+++	+++	+++	++	++	+++
ELISA	Yes	+++	+++	++++	+++	++++	++++	+++++	++++
ImmunoStrips	Yes	++	+++	++++	++++	+++++	+++	+++	+++
dsRNA	No	++	++	+++	++	+++	++	+++	++
PCR, RT-PCR, RPA, LAMP	Yes	++++	++++	++	+++	++	++++	+++	+++
Real-time PCR	Yes	+++++	++++	++	+++++	++	++++	+++	+++
NASH, Macro-, Microarray	Yes	+++	++++	++	+++	+++	+++	++	+++
Next-Gen Sequencing	No	+++++	+++++	++	+	+	+	+	+++++

- ❖ Abs or Seq Info: Requires virus-specific antibodies or sequence information (primers or probes).
- ❖ Sensitivity: Probability of detecting true positives.
- ❖ Specificity: Probability of detecting true negatives.
- ❖ Feasibility: Requirement for specific expertise and practicability in routine analysis, execution and interpretation.
- ❖ Rapidness: Rapidity of diagnostic results.
- ❖ Equip: Requirement for sophisticated equipment.
- ❖ HTP: Adaptability to high-throughput testing.
- ❖ Cost: Expense of individual assays.
- ❖ Value: Diagnostic value for virus identification.

> Adapted from Applied Plant Virology, Calum R. Wilson (2014). CABI. (Table 6.1, Page 127)