

DETECTION OF MICROORGANISMS – PLANT PATHOGENS

Depending on pests, host plants, time of the year and others relevant information different methods for testing are chosen:

- Bacteria: plating, immunofluorescence, PCR, real time PCR, digital PCR, test plants (enrichment, pathogenicity test), RFLP, hypersensitive reaction, biochemical tests, sequencing, repetitive PCR, MALDI-TOF
- Viruses: serological test ELISA, test plants, electron microscopy, PCR, RT-PCR, sequencing of PCR products, RT- real time PCR, high throughput sequencing (HTS)
- Pospiviroids: RT-PCR, sequencing of PCR products, RT- real time PCR, test plants, high throughput sequencing (HTS)
- Phytoplasms: real time PCR, nested PCR, RFLP, sequencing, LAMP

According to the legislation, we are obliged to inform The administration of the Republic of Slovenia for food safety, veterinary and plant protection in case we identify in Slovenia (i) harmful organisms (HO) listed in the annex IIA, IIB and III of the Annexes of EU Regulation 2019/2072 and also non-compliance with other Annexes of this Regulation, (ii) HO for which the European Commission has prescribed the temporary emergency measures or HO that pose a danger to plant health in the territory of Slovenia (provision of the Phytosanitary administration) (iii) other HO that have not yet been confirmed in Slovenia (the first finding) (iv) in case of the outbreak of the regulated and non-regulated harmful organisms. . This laboratory agrees it will take care, within its power, to provide credible identification of delivered samples. Laboratory cannot accept liability in case of damages suffered by clients, which result from determination of harmful organisms.

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| P O T A T O | |
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| VIRUSES * testing by arrangement | PVY (Potato virus Y) |
| | PLRV (Potato leafroll virus) |
| | PVX (Potato virus X) |
| | PVM (Potato virus M) |
| | PVV (Potato virus V) |
| | PVA (Potato virus A) |
| | PVS (Potato virus S) |
| BACTERIA | RSSC (<i>Ralstonia solanacearum</i> species complex) |
| | Cms (<i>Clavibacter sepedonicus</i>) |
| | soft rot bacteria of ex <i>Erwinia</i> spp.(genus <i>Pectobacterium</i> and <i>Dickeya</i>) |
| | <i>Candidatus</i> Liberibacter solanacearum (Lso) |

| PEPPER and TOMATO | |
|--------------------------|---|
| VIRUSES | ToBRFV (Tomato brown rugose fruit virus) (seeds, fruits and plants) |
| | PVY (Potato virus Y) |
| | TMV (Tobacco mosaic virus) |
| | CMV (Cucumber mosaic virus) |
| | PepMV (Pepino mosaic virus) (tomato) (seeds and plants) |
| | AMV (Alfalfa mosaic virus) |
| | TSWV (Tomato spotted wilt virus) |
| | INSV (Impatiens necrotic spot virus) |
| | CSNV (Chrysanthemum stem necrosis virus) |
| | ToMV (Tomato mosaic virus) |
| | TYLCV (Tomato yellow leaf curl virus) (tomato) |
| | ToLCNDV (Tomato leaf curl New Delhi virus) |

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| | Begomoviruses listed on 13.F. Annex II of 2019/2072/EU |
| | ToRSV (Tomato ringspot virus) (tomato) |
| | TAV (Tomato aspermy virus) (tomato) |
| | TICV (Tomato infectious chlorosis virus) (tomato) |
| | ToCV (Tomato chlorosis virus) (tomato) |
| | BBWV 1 (Broad bean wilt virus 1) (pepper) |
| | BBWV 2 ((Broad bean wilt virus 2) (pepper) |
| | PVX (Potato virus X) (tomato) |
| POSPIVIROIDS | Potato spindle tuber viroid and other pospiviroids (seeds and plants) |
| BACTERIA | Xcv (<i>Xanthomonas campestris</i> pv. <i>vesicatoria</i>) |
| | RSSC (<i>Ralstonia solanacearum</i> species complex) |
| | Cmm (<i>Clavibacter michiganensis</i> ssp. <i>michiganensis</i>) |
| | Ps (<i>Pseudomonas syringae</i>) |
| | <i>Candidatus Liberibacter solanacearum</i> (Lso) |
| | soft rot bacteria of ex <i>Erwinia</i> spp. (genus <i>Pectobacterium</i> and <i>Dickeya</i>) |

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|-----------------|--|
| B E A N | |
| VIRUSES | CMV (<i>Cucumber mosaic virus</i>) |
| | * testing by arrangement: BCMV (<i>Bean common mosaic virus</i>), BYMV (<i>Bean yellow mosaic virus</i>) |
| BACTERIA | <i>Xanthomonas axonopodis</i> pv. <i>phaseoli</i> , |
| | * testing by arrangement: <i>Pseudomonas savastanoi</i> pv. <i>phaseolicola</i> |

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| G A R L I C, O N I O N, L E E K | |
| VIRUSES | IYSV (<i>Iris yellow spot virus</i>) |
| | * testing by arrangement: OYDV (<i>Onion yellow dwarf virus</i>), GCLV (<i>Garlic common latent virus</i>), LYSV (<i>Leek yellow stripe virus</i>), SLV (<i>Shallot latent virus</i>), aleksiviruses |

| C U C U M B E R | |
|---|---|
| VIRUSES | TSWV (Tomato spotted wilt virus) |
| | INSV (Impatiens necrotic spot virus) |
| | CSNV (Chrysanthemum stem necrosis virus) |
| | PRSV (Papaya ringspot virus) |
| | SqMV (Squash mosaic virus) |
| | TNV-p (Tobacco necrosis virus-p) |
| | ToRSV (Tomato ringspot virus) |
| | TRSV (Tobacco ringspot virus) |
| | ToLCNDV (Tomato leaf curl New Delhi virus) |
| | Begomoviruses listed on 13.F. Annex II of 2019/2072/EU |
| | WMV (Watermelon mosaic virus) |
| | ZYMV (Zucchini yellow mosaic virus) |
| | CMV (Cucumber mosaic virus) |
| | CGMMV (Cucumber green mottle mosaic virus) |
| * testing by arrangement: MWMV (Moroccan watermelon mosaic virus) | |
| BACTERIA | * testing by arrangement: pathogenic bacteria from the genus <i>Xanthomonas</i> |
| | * testing by arrangement: pathogenic bacteria from the genus <i>Pseudomonas</i> |

| S T R A W B E R R Y | |
|----------------------------|---|
| BACTERIA | * testing by arrangement: Xf (<i>Xanthomonas fragariae</i>) |

| F R U I T T R E E S | |
|----------------------------|--|
| PHYTOPLASMAS | AP (Apple proliferation) |
| | ESFY (European stone fruit yellow disease) |

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| | PD (Pear decline) |
| | * testing by arrangement: AY (Aster yellows), ' <i>Candidatus</i> Phytoplasma pruni', ' <i>Candidatus</i> Phytoplasma phoenicium' |
| BACTERIA | Xap (<i>Xanthomonas arboricola</i> pv. <i>pruni</i>) |
| | Ea (<i>Erwinia amylovora</i>) |
| | Ps (<i>Pseudomonas syringae</i>) |
| | Xyf (<i>Xylella fastidiosa</i>) |

| G R A P E V I N E | |
|--------------------------|---|
| VIRUSES | * testing by arrangement: GFLV (<i>Grapevine fanleaf virus</i>), GVA (<i>Grapevine virus A</i>), GVB (<i>Grapevine virus B</i>), GFkV (<i>Grapevine fleck virus</i>), GLRaV-1 (<i>Grapevine leafroll-assoc. virus 1</i>), GLRaV-2 (<i>Grapevine leafroll-assoc. virus 2</i>), GLRaV-3 (<i>Grapevine leafroll-assoc. virus 3</i>), GLRaV-6 (<i>Grapevine leafroll-assoc. virus 6</i>), ArMV (<i>Arabis mosaic virus</i>), RSPaV-1 (<i>Rupestris stem pitting associated virus</i>) |
| BACTERIA | Xamp (<i>Xylophilus ampelinus</i>) |
| | Xyf (<i>Xylella fastidiosa</i>) |
| PHYTOPLASMAS | * testing by arrangement: AY (Aster yellows), ' <i>Candidatus</i> Phytoplasma pruni' |
| | FD (Flavescence doree) |
| | BN (Bois noir phytoplasma) |

| MAIZE | |
|---------------------|---|
| PHYTOPLASMAS | MR (Maize redness) |
| BACTERIA | <i>Erwinia stewartii</i> (<i>Pantoea stewartii</i>) |

| P E L A R G O N I U M | |
|------------------------------|---------------------------------------|
| VIRUSES | PFBV (Pelargonium flower break virus) |
| | PLPV (Pelargonium line pattern virus) |
| | PLCV (Pelargonium leaf curl virus) |
| | ToRSV (Tomato ringspot virus) |

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|-----------------|---|
| | TSWV (Tomato spotted wilt virus) |
| | TRSV (Tobacco ringspot virus) |
| | INSV (Impatiens necrotic spot virus) |
| | CMV (Cucumber mosaic virus) |
| BACTERIA | Xcp (<i>Xanthomonas campestris</i> pv. <i>pelargonii</i>) |
| | RSSC (<i>Ralstonia solanacearum</i> species complex) |
| | soft rot bacteria of ex <i>Erwinia</i> spp. (genus <i>Pectobacterium</i> and <i>Dickeya</i>) |

| C H R Y S A N T H E M U M | |
|----------------------------------|--|
| VIRUSES | TSWV (Tomato spotted wilt virus) |
| | INSV (Impatiens necrotic spot virus) |
| | CSNV (Chrysanthemum stem necrosis virus) |
| | CVB (Chrysanthemum virus B) |
| | TAV (Tomato aspermy virus) |
| BACTERIA | soft rot bacteria of ex <i>Erwinia</i> spp (genus <i>Pectobacterium</i> and <i>Dickeya</i>) |
| VIROID | CSVd (Chrysanthemum stunt viroid) |

| E U P H O R B I A P U L C H E R R I M A | |
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| BACTERIA | Xapoin (<i>Xanthomonas axonopodis</i> pv. <i>poinsettiicola</i>) |

| W A T E R A N D H O S T P L A N T S B E S I D E T H E W A T E R | |
|--|---|
| BACTERIA | RSSC (<i>Ralstonia solanacearum</i> species complex) |
| VIRUSES | ToBRFV (Tomato brown rugose fruit virus) |

| K I W I | |
|-----------------|--|
| BACTERIA | <i>Psa (Pseudomonas syringae pv. actinidiae)</i> |

| INSECT VECTORS | |
|---------------------|--|
| PHYTOPLASMAS | AP (Apple proliferation) / ESFY (European stone fruit yellow disease) / PD (Pear decline) / FD (Flavescence doree) / BN (Bois noir phytoplasma) oziroma MR (Maize redness) |
| BACTERIA | <i>Xyf (Xylella fastidiosa)</i> |

| OTHER PLANTS | |
|---------------------|---|
| BACTERIA | <i>Ea (Erwinia amylovora)</i> - cotoneaster, <i>Pyracantha coccinea</i> , crataegus and <i>Sorbus aucuparia</i> and other host plants |
| | <i>Xyf (Xylella fastidiosa)</i> |
| | * testing by arrangement: pathogenic bacteria from the genus <i>Xanthomonas</i> |
| | * testing by arrangement: pathogenic bacteria from the genus <i>Pseudomonas</i> |
| | * testing by arrangement: soft rot bacteria of ex <i>Erwinia</i> spp. (genus <i>Pectobacterium</i> and <i>Dickeya</i>) |
| PHYTOPLASMAS | * testing by arrangement |
| VIRUSIES | * testing by arrangement |
| POSPIVIROIDI | * testing by arrangement |

LEGEND:

* testing by arrangement: for those plant pathogens that are rarely tested in our lab; please contact us by e-mail: labfito@nib.si