

**PROJECT FULL TITLE:**  
**DEVELOPMENT OF A NEW DIAGNOSTIC TOOL USING DNA BARCODING TO IDENTIFY  
 QUARANTINE ORGANISMS IN SUPPORT OF PLANT HEALTH**

**GRANT AGREEMENT NO.: (226482)**

Date: 21 September 2009  
 Partner responsible: VLAGEW-ILVO, Belgium  
 Coordinator and contact: Dr. Martine Maes, [martine.maes@ilvo.vlaanderen.be](mailto:martine.maes@ilvo.vlaanderen.be)

**Table of Q and Q alert bacteria selected for the QBOL program, indicated with  
 executing partner**

Partner 3: VLAGEW-ILVO, Partner 4: LM-UGent, Partner 5: ACW

| Annex I, Part A, Section I   | First focus      | Second focus | Partner |
|--|------------------|--------------|---------|
| <i>Xylella fastidiosa</i>  | X                |              | 5       |
| <b>Annex I, Part A, Section II</b>   |                  |              |         |
| <i>Clavibacter michiganensis</i> subsp. <i>sepedonicus</i>                   | X                |              | 4       |
| <i>Pseudomonas solanacearum</i> = <i>Ralstonia solanacearum</i>              | X<br>3 phlotypes |              | 5       |
| <b>Annex II, Part A, Section I</b>   |                  |              |         |
| <i>Xanthomonas</i> strains pathogenic to Citrus                              | X<br>3 subspp.   |              | 3       |
| <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> & <i>oryzicola</i>               | X<br>2 pvs       |              | 3       |
| <b>Annex II, Part A, Section II</b>  |                  |              |         |
| <i>Clavibacter michiganensis</i> subsp. <i>insidiosus</i>                    | X                |              | 4       |
| <i>Clavibacter michiganensis</i> subsp. <i>michiganensis</i>                 | X                |              | 4       |
| <i>Xanthomonas axonopodis</i> pv. <i>phaseoli</i>                            |                  | X            | 3       |
| <i>Xanthomonas vesicatoria</i> & <i>X. axonopodis</i> pv. <i>vesicatoria</i> |                  | XX           | 3       |
| <i>Xanthomonas fragariae</i>   |                  | X            | 3       |
| <i>Xanthomonas translucens</i>   |                  | X            | 3       |
| <b>Q-alert EPP0</b>  |                  |              |         |
| <i>Xanthomonas axonopodis</i> pv. <i>dieffenbachiae</i>                      |                  | X            | 3       |
| <i>Xanthomonas axonopodis</i> pv. <i>allii</i>                               |                  | X            | 3       |

Strains for sequencing have been identified for the first-focus-targets, taking into account the expected variation within the taxon. They are acquired from official and working collections. The list of second-focus-strains is not complete yet and is gradually adapted based on new incoming information from possible providers.

Listed strains are in the QBOL working collection or readily available to QBOL

**First-focus targets**

***Xanthomonas oryzae***

***X. oryzae* pv. *oryzae***

79 strains

Origin:

|               |             |
|---------------|-------------|
| Far east      | China       |
|               | India       |
|               | Indonesia   |
|               | Japan       |
|               | Malaysia    |
|               | Nepal       |
|               | Philippines |
| West Africa   | Burkina     |
|               | Cameroon    |
|               | Mali        |
| South-America | Bolivia     |
|               | Columbia    |

***X. oryzae* pv. *oryzicola***

19 strains

Origin:

|             |             |
|-------------|-------------|
| Far east    | China       |
|             | Malaysia    |
|             | Philippines |
| West Africa | Mali        |

**Relatives:**

*X. vasicola* pv. *holcicola*:

4 strains, origin; Australia, Ethiopia, US, New Zealand

*X. vasicola* pv. *vasicola*:

4 strains, origin; Madagascar, Mauritius, Puerto Rico, South Africa

***Xanthomonas* isolates from rice, not pathogenic**

21 strains, origin; China, Philippines

***Xanthomonas* on Citrus**

***X. citri* subsp. *citri***

52 strains

Origin:

|           |
|-----------|
| Argentina |
| Australia |
| Bolivia   |
| Brazil    |
| China     |
| Fiji      |
| Florida   |
| Guan      |
| Hong Kong |
| India     |
| Iran      |
| Japan     |

|                  |
|------------------|
| Korea            |
| Malaysia         |
| Mauritius        |
| New Zealand      |
| Oman             |
| Pakistan         |
| Paraguay         |
| Philippines      |
| Reunion          |
| Rodrigues Island |
| Saudi Arabia     |
| Taiwan           |
| Thailand         |
| Uruguay          |
| US               |
| Yemen            |

**Relatives:**

|  |
|--|
| X. citri pv. anacardii (X. campestris pv. mangiferaeindicae) |
| X. campestris pv. durante                                    |
| X. axonopodis pv. glycines                                   |
| X. axonopodis pv. clitoriae                                  |
| X. campestris vitistrifoliae                                 |
| X. campestris pv. viticola                                   |
| X. campestris pv. vitiscarnosae                              |
| X. axonopodis pv. khayae                                     |
| X. axonopodis pv. martynicola                                |
| X. axonopodis pv. malvacearum                                |
| X. axonopodis pv. cajani                                     |
| X. axonopodis pv. punicae                                    |
| X. axonopodis pv. melhusii                                   |
| X. campestris pv. azadirachtae                               |
| X. campestris pv. bauhiniiae                                 |
| X. campestris pv. leeana                                     |
| Pseudomonas cissicola  |
| X. citri subsp. malvacearum                                  |
| X. campestris  |

***X. alfalfae* subsp. *citrumelonis***

8 strains

Origin:

|    |
|----|
| US |
|----|

**Relatives:**

|                                      |
|--------------------------------------|
| X. alfalfae subsp. alfalfae          |
| X. axonopodis pv. alfalfae           |
| X. axonopodis pv. coracanae          |
| X. axonopodis pv. desmodii gangetici |
| X. axonopodis pv. erythrinae         |
| X. axonopodis pv. lespedezae         |
| X. axonopodis pv. nakataecorchori    |
| X. axonopodis pv. phylanthii         |
| X. axonopodis pv. physalidicola      |
| X. campestris pv. alangii            |
| X. campestris pv. amorphophalli      |
| X. campestris pv. argemones          |

|                               |
|-------------------------------|
| X. campestris pv. betae       |
| X. campestris pv. heliotropii |
| X. campestris pv. ionidii     |
| X. campestris pv. physalidis  |
| X. campestris pv. tribuli     |

**X. fuscans subsp. aurantifolii**

17 strains

Origin:

|           |
|-----------|
| Argentina |
| Brazil    |
| Mexico    |
| Uruguay   |

Relatives:

|                                     |
|-------------------------------------|
| X. axonopodis pv. rhynchosiae       |
| X. axonopodis pv. sesbaniae         |
| X. axonopodis pv. vignaeradiatae    |
| X. fuscans subsp. fuscans           |
| X. axonopodis pv. vignicola         |
| Xanthomonas sp. pv. aracearum       |
| Xanthomonas sp. pv. merremiae       |
| Xanthomonas sp. pv. thirumalacharii |
| Xanthomonas sp. pv. trichodesmae    |

**Clavibacter**

**Clavibacter michiganensis subsp. michiganensis**

61 strains

**Clavibacter michiganensis subsp. sepedonicus**

97 strains

**Clavibacter michiganensis subsp. insidiosus**

40 strains

Relatives:

|   |
|---|
| Clavibacter michiganensis subsp. nebraskensis |
| Clavibacter michiganensis subsp. tessellarius |
| Clavibacter rathayi                           |
| Clavibacter toxicus                           |
| Clavibacter tritici                           |
| Leifsonia aquatic                             |
| Leifsonia naganoensis                         |
| Leifsonia poae                                |
| Leifsonia shinshuensis                        |
| Leifsonia pindariensis                        |
| Leifsonia xyli                                |
| Leifsonia xyli subsp. xyli                    |
| Leifsonia xyli subsp. cynodontis              |
| Rathayibacter sp.                             |
| Rathayibacter iranicus                        |
| Rathayibacter rathayi                         |
| Rathayibacter toxicus                         |

|                       |
|-----------------------|
| Rathayibacter tritici |
|-----------------------|

---

***Ralstonia solanacearum***

114 strains

Representative strains from Race 3, Biovar 2 (& 2T, 2A)  
Race 1, Biovars 1 / 3 / 4 / 5  
Race 3, Biovar 1

Origin:

|                  |
|------------------|
| Belgium          |
| Brazil           |
| China            |
| Colombia         |
| Costa Rica       |
| Cyprus           |
| Egypt            |
| Fiji             |
| France           |
| Hawai            |
| Honduras         |
| Indonesia        |
| Israel           |
| Japan            |
| Mali             |
| Kenya            |
| La Réunion       |
| Malaysia         |
| Marocco          |
| Mauritius        |
| Netherlands      |
| Panama           |
| Papua New Guinea |
| Peru             |
| Philippines      |
| Portugal         |
| Sri Lanka        |
| Sumatra          |
| Sweden           |
| Trinidad         |
| Turkey           |
| Uganda           |
| United Kingdom   |
| USA              |
| Zimbabwe         |

**Relatives:**

|                           |
|---------------------------|
| Ralstonia insidiosa       |
| Ralstonia mannitolilytica |
| Cupriavidus necator       |
| Cupriavidus metallidurans |
| Burkholderia andropogonis |
| Burkholderia cepacia      |

***Xylella fastidiosa***

7 strains

Origin:

USA

Host:

Prunus salicina, Ambrosia artemisifolia, mulberry, almond, Vitis vinifera, Vitis rotundifolia

## **Second-focus targets**

### ***Xanthomonas axonopodis* pv. *phaseoli***

14 strains

#### **Relatives:**

|                               |
|-------------------------------|
| X. campestris pv. passiflorae |
| X. axonopodis pv. manihotis   |

### ***Xanthomonas axopodis* pv. *vesicatoria***

24 strains

#### **Relatives:**

|                             |
|-----------------------------|
| X. campestris pv. eucalypti |
| X. campestris pv. laureliae |

### ***Xanthomonas axonopodis* pv. *dieffenbachiae***

12 strains

#### **Relatives:**

|                            |
|----------------------------|
| X. axonopodis pv. begoniae |
| X. campestris pv. syngonii |

### ***Xanthomonas axonopodis* pv. *allii***

7 strains

#### **Relatives:**

|                               |
|-------------------------------|
| X. axonopodis pv. cyamopsidis |
| X. axonopodis pv. betlicola   |
| X. sacchari                   |
| X. pisi                       |

### ***Xanthomonas fragariae***

36 strains

#### **Relatives:**

|                         |
|-------------------------|
| X. campestris zinniae   |
| X. campestris cannabis  |
| X. campestris esculenti |

### ***Xanthomonas translucens* pv. *translucens***

8 strains

#### **Relatives:**

|                                 |
|---------------------------------|
| X. translucens pv. cerealis     |
| X. translucens pv. hordei       |
| X. translucens pv. secalis      |
| X. translucens pv. undulosa     |
| X. translucens pv. graminis     |
| X. campestris pv. phormiicola   |
| X. translucens pv. poae         |
| X. translucens pv. arrhenatheri |
| X. translucens pv. phlei        |

|                                   |
|-----------------------------------|
| X. translucens pv. phleipratensis |
| X. campestris pv. gummisudans     |