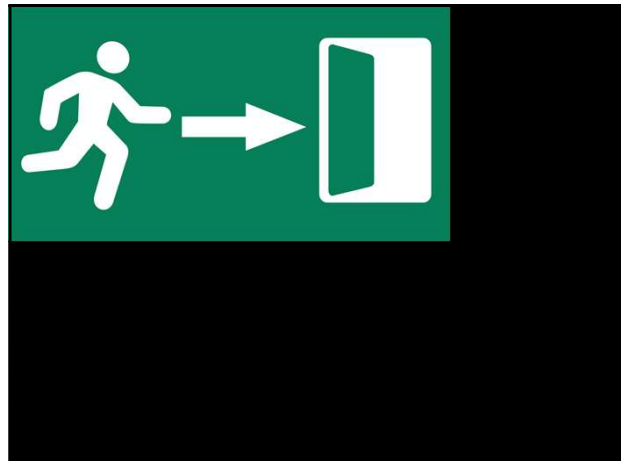


**Virus dicovery:**  
**After the deluge.....**  
**... a framework !!!**


Prof. Sébastien Massart – Plant Pathology Laboratory –  
Gembloux Agro-Bio Tech – University of Liège



Gembloux Agro-Bio Tech  
Université de Liège

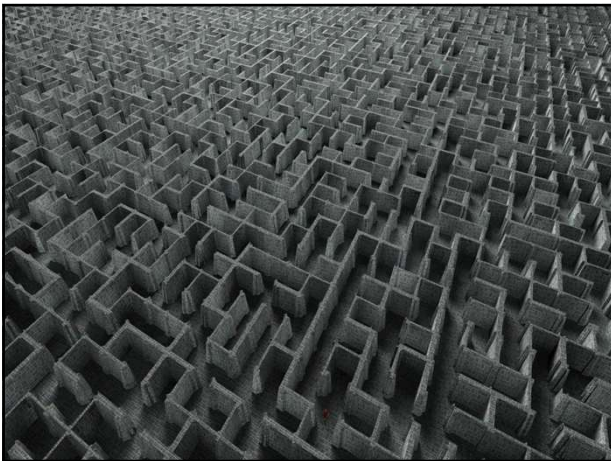


**Which one of the new viruses represents a threat for the plant trade and growth ?**



**Biological characterization of the new virus !!!**





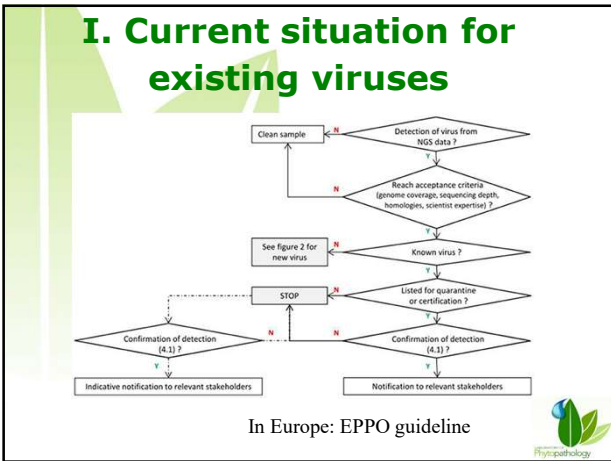
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PERSPECTIVE  
published: 24 January 2017  
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**A Framework for the Evaluation of Biosecurity, Commercial, Regulatory, and Scientific Impacts of Plant Viruses and Viroids Identified by NGS Technologies**

Sebastien Massart<sup>1\*</sup>, Thierry Candresse<sup>2</sup>, José Gil<sup>3</sup>, Christophe Lacomme<sup>4</sup>, Lukas Predajna<sup>5</sup>, Maja Ravnikar<sup>6</sup>, Jean-Sébastien Reynard<sup>7</sup>, Artemis Rombou<sup>8</sup>, Pasquale Saldarelli<sup>9</sup>, Dijana Škorić<sup>10</sup>, Eeva J. Vainio<sup>11</sup>, Jari P. T. Valkonen<sup>12</sup>, Hervé Vanderschuren<sup>13</sup>, Christina Varven<sup>14</sup> and Thierry Wetzel<sup>15</sup>

*Phytopathology*



### II. Emerging challenges for scientists and authorities

# NGS drives an inverted approach for diagnostic: detection on asymptomatic samples

=> **QUESTIONS**

- Is every virus a threat ?
- Or natural symbionts in the ecosystems ?
- Actions to take with new sequences in terms of plant health ?
- Regulations ? Quarantine ? Import/export ?

=> **Guidelines proposals needed**

*Phytopathology*

### III. Pest Risk Assessment

**6 categories of information needed :**

1. Identity of a pest
2. Data on its distribution
3. Host range
4. Modes of spread
5. Local agro-environmental conditions
6. Ability to cause a disease

*Phytopathology*

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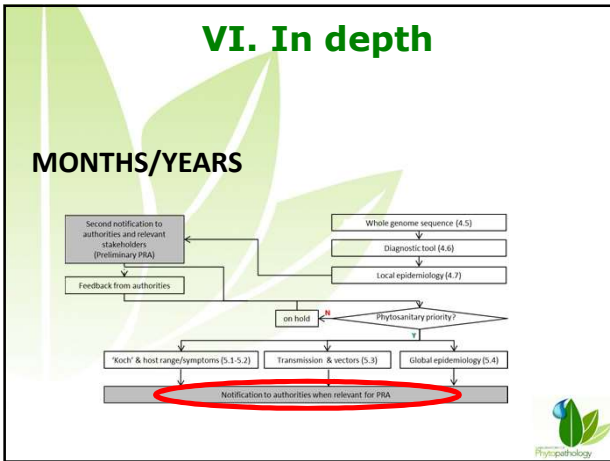
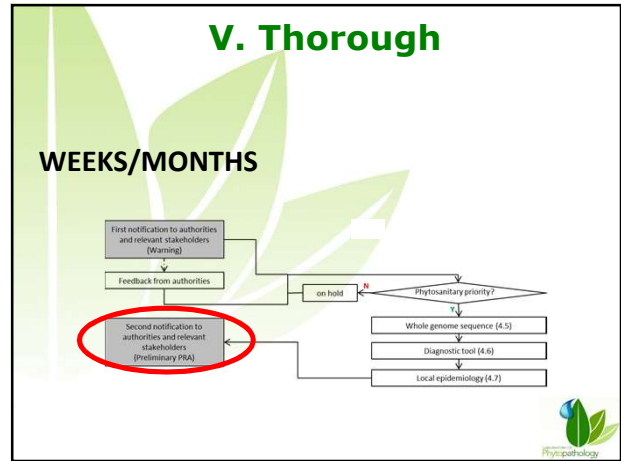
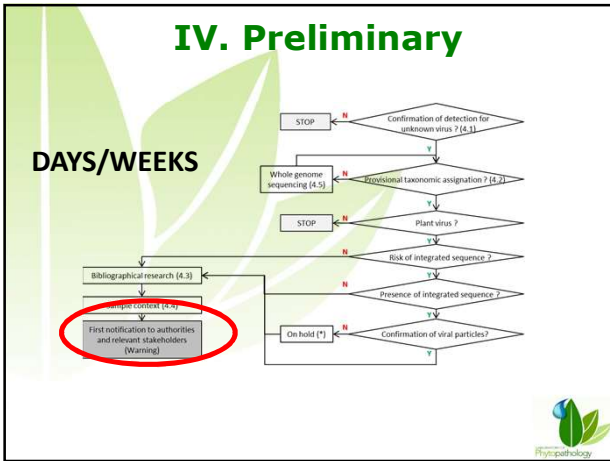
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1. Preliminary biological characterization  
2. Throught biological characterization  
3. In depth biological characterization

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### VI. In depth

**Classical / molecular virology:**

Cracking down mixed infection / Infectious clones / Survey at larger scales / Population genetic / Inoculation, symptomatology / Koch postulate / Horizontal and vertical transmission / Host range / Interaction with other viruses / Antibody development

### VII. GPGV

- Identified by NGS in Italy in 2012  
 - Found since in Slovenia, Slovakia, Czech Republic, Greece, France, Korea, United States, Canada and China  
 - Recently found in Germany

**JKI**  
Julius Kühn-Institut

**Express – PRA<sup>®</sup> zu Grapevine Pinot gris virus (GPGV) – Auftreten**  
 erstellt von: Julius Kühn-Institut, Institut für nationale und internationale Angelegenheiten der Pflanzengesundheit am 12.05.2016, Zuständige Mitarbeiter: Dr. Silke Steinhilber, Dr. Michael Maunier, Dr. Ernst Pfankuch

**Anlass:** Auftreten des Virus in einem Weinberg in Baden-Württemberg

Express - PRA	Grapevine Pinot gris virus		
Phytosanitäres Risiko für DE	hoch <input type="checkbox"/>	mittel <input type="checkbox"/>	niedrig <input checked="" type="checkbox"/>
Phytosanitäres Risiko für EU-MS	hoch <input type="checkbox"/>	mittel <input type="checkbox"/>	niedrig <input checked="" type="checkbox"/>
Sicherheit der Einschätzung	hoch <input type="checkbox"/>	mittel <input checked="" type="checkbox"/>	niedrig <input type="checkbox"/>
Fazit	Das erst im Jahr 2012 in Italien entdeckte Grapevine Pinot gris virus wurde in Deutschland bisher nicht nachgewiesen, ist jedoch bereits in einigen Ländern der EU nachgewiesen worden. Es ist daher wieder in den Anhängen der RL 2002/29/ES nach bei der EPPO gelistet.		

### VIII. Conclusion

- ✓ Virus discovery is becoming easy
- BUT....
- ✓ Biological characterization will remain bottleneck
- ✓ Framework of assays
- ✓ Adaptive PRA at 3 levels with continuous re-evaluation of risk

## **Work done through COST Action FA1407**

[www.cost-divas.eu](http://www.cost-divas.eu)

**Use of NGS for study and diagnostic of plant  
viruses**

- 1. Proficiency testing for virus discovery**
- 2. Proficiency testing for SNV**
- 3. Etiology fair + training school**
- 4. Stakeholders engagement**



## **Interesting event :**

**EPPO-COST DIVAS Workshop**

**Use of NGS technologies for plant pest  
diagnostics**

**Bari (IT), 2017-11-22/23**

