Emergence in France of *Pseudomonas syringae pv. actinidiae* (Takikawa et al., 1989).

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*Pseudomonas syringae pv. actinidiae* (Psa) is the **causal agent of bacterial canker of kiwifruit**. The symptoms are characterized by cankers on leaders and trunks, shoot blight and leaf spot with halos. The Plant Health Laboratory detected and identified this emerging bacterium on *Actinidia chinensis* (yellow fleshes) in July 2010. Since, Psa is causing **severe damage in France on Actinidia chinensis and Actinidia delicosa** (green fleshes). Optimal range of temperatures for growth of Psa is 10-20°C, no symptom is observed above 25°C.

**Present distribution of Psa:**
- 1984: **Japan** (Takikawa et al., 1989; Serizawa et al., 1989),
- 1992: **Korea** (Koh & Lee, 1994) and **Italy** (Scortichini, 1994) where outbreaks had been eradicated,
- 2007: **Again in Italy** (Balestra, 2009),
- 2010: **France** (OEPP, 2010), **Portugal** (Balestra, 2010), **New Zealand** (2010, MAF Biosecurity Website),
- 2011: **Chile**, **Australia**, **Switzerland**, **Spain** and **Turkey** (OEPP).

Over the past 2 years, areas of Kiwifruit orchard increased in South of France, they represent nearly 4200 ha and 70 000 tons of fruits (FAOSTAT, 2009), 2/3 of this production is exported. France is the second European producer behind Italy.

**METHODS AND RESULTS**

→ Detection by **isolation on King’s medium B** (KB-King et al., 1954) from leaf spots and infected canes.

→ Identification with **biochemical and molecular tests** to distinguish Psa from other bacterial species and from other *P. syringae pathovars* (collection of 130 French isolates of Psa in 2011).

- Psa is a Gram negative bacteria, non fluorescent on KB, induces a HR, do not have a cytochrome c oxidase, an arginine dehydrolyase or urease activity, do not hydrolyse esculin, starch or gelatin. The use of **M2 medium** (Luizetti & pers.comm) could differentiate the 2008 Italian isolates from Japanese ones. Difficulties of recovery are mainly explained by the presence of saprophytic organisms and high temperatures.

- Amplifying total DNA of these strains, the primers PsaF1/R2 (Rees et al., 2010) resulted in a 280 bp fragment. A study on specificity with reference strains showed cross reactions of PsaF1/R2 primers with *P. syringae pv. avellaneae*. The recent duplex PCR (Koh6KmNov primers with AvDdxp-K/F primers) published by Gallelli et al. (2011) could be an alternative, currently being evaluated by Plant Health Laboratory.

→ **Biomolecular patterns of French isolates of Psa**

- **Effector gene hopA1**: presence in Psa strains isolated in France in 2010 and in Italy strains after 2008 (Vanneste J. et al., 2011).

- **cts haplotype**: 2010 French isolates showed same cts haplotype than 2008 Italian ones (cts haplotype I). The other cts haplotype A is mainly observed on Asian strains and on 1992 Italian ones (Vanneste J. et al., 2010).

- **BOX PCR electrophoretic profile**: the results showed correlation with the 2 groups of cts haplotype.

Although this is not a sufficient evidence to prove the origin of the pathogen in France, it suggests a connection between the Italian and the subsequent French outbreaks. After one year of survey, it appears that more than one profile may be present in France.

**PERSPECTIVES**

Variability at the molecular level, as illustrated by several fingerprints, will be used for further epidemiological studies and development of molecular typing tools and diagnostic methods.