

Technology Transfer from COST853 to COST873

‘Bacterial Diseases of Stone Fruits and Nuts’

Brion Duffy



StoneFruitNutHealth
COST 873

What is COST873?



COST 873

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About COST 873

COST Action 873 is a large network of leading European and Mediterranean specialists in 18 countries. Our participants are involved in all aspects of bacterial diseases of stone fruits and

New Action from 2006-2011.

Network in currently 20 countries

Bacteriologists

Plant pathologists

Plant breeders

Epidemiologists

Plant protection officers/agencies

SMEs in diagnostics/plant protection

register and contact either the Chair, a working Group leader or your COST [National Delegate](#) .

COST 873 Countries



National Information

 [Czech Republic](#)



StoneFruitNutHealth

What is the mission of COST873?

Solutions to chronic and emerging disease threats on all stone fruits or nuts in the European sphere.

Plant protection from quarantine to chemical - biocontrol - host resistance.

Natl and Intl PPOs are a key stakeholder in COST873

**Scope: 16 pathogens (4 quarantine)
11 hosts**

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How will COST873 benefit from COST853?

- **Diagnostics for plant inspection**
- **Pathogen genotyping**
- **Host genotyping for orchard design**
- **Pathogen/Host transcriptomics to develop novel targets for control**

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Pathogen diagnostics are essential to plant inspection

Rapid, simple diagnostics for a wide-array of bacteria is key to duties of Plant Protection Officers

Current methods

unique for each organism

requires a portfolio of methods for all pathogens

bacteria may be outside specialisation of PPOs

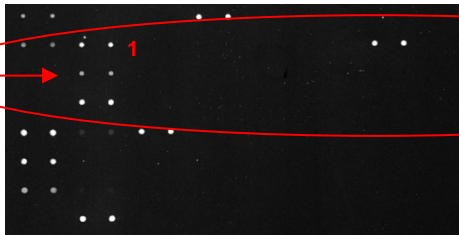
limits focus to the expected, miss covert invasions

Plant inspection chip for quarantine bacteria

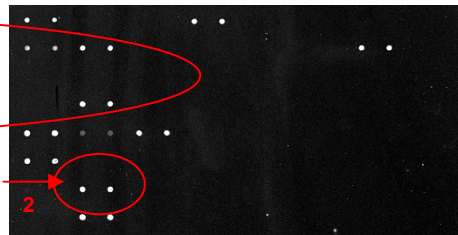
Effective at the Genus and Species levels.

Effective at the subspecies level for some bacteria: *Clavibacter* example

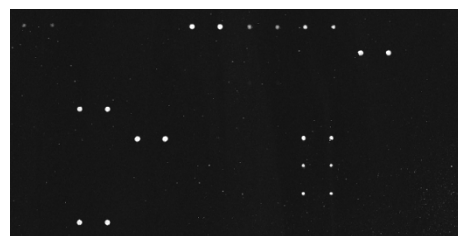
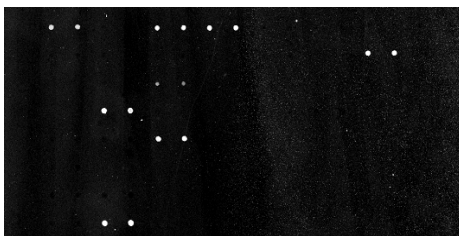
Eub	Archae	Ral	SC	X.-es	X.-as	Pseu	Entceae
Micro	Cm	B.car	Xy.am	X.fra	H ₂ O	SC	E.am
Cu	Cms	R. sol	r-X.or	r-X.vesi	r-X.tr	r-P.sy	P.stst
H ₂ O	SC	H ₂ O	r-X.oror	r-X.ve/fra	r-X.trtr	r-P.syp	E.ch
g-C.mm/s ₂	Cmi4	SC	f-X.or	f-X.vesi	r-X.arb	H ₂ O	H ₂ O
g-C.mi2	H ₂ O	H ₂ O	H ₂ O	g-X.ax/ve	g-X.arb1	H ₂ O	H ₂ O
g-C.ms ₃	Cmm ₃	H ₂ O	H ₂ O	H ₂ O	g-X.arb2	H ₂ O	H ₂ O
g-Cu.f	SC	H ₂ O	H ₂ O	H ₂ O 2.	H ₂ O	H ₂ O	H ₂ O



C.m.s.



C.m.m.

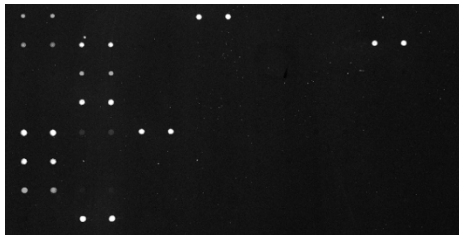


1. *Clavibacter* genus probe lights up for both subspecies.
2. Subspecies probes for *C.michiganensis* subsp. *sepedonicus* and *C.m. michiganensis* are discriminatory.

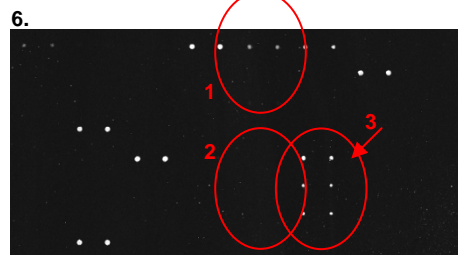
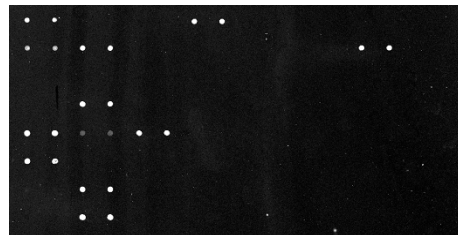
Plant inspection chip for quarantine bacteria

Falls short for other bacteria at the subspecies level: *Xanthomonas* example

Eub	Archae	Ral	SC	X.-es	X.-as	Pseu	Entceae
Micro	Cm	B.car	Xy.am	X.fra	H ₂ O	SC	E.am
Cu	Cms	R. sol	r-X.or	r-X.vesi	r-X.tr	r-P.sy	P.stst
H2O	SC	H ₂ O	r-X.oror	r-X.ve/fra	r-X.trtr	r-P.syp	E.ch
g-C.mm/s ₂	Cmi4	SC	f-X.or	f-X.vesi	r-X.arb	H ₂ O	H ₂ O
g-C.mi2	H ₂ O	H ₂ O	H ₂ O	g-X.ax/ve	g-X.arb1	H ₂ O	H ₂ O
g-C.ms ₃	Cmm ₃	H ₂ O	H ₂ O	H ₂ O	g-X.arb2	H ₂ O	H ₂ O
g-Cu.f	SC	H ₂ O	H ₂ O	H ₂ O 2.	H ₂ O	H ₂ O	H ₂ O



C.m.s.



X.a. pv. pruni

1. Only *Xanthomonas* lights up the Genus probe.
2. Only *aboricola* lights up the Species probes.
3. But pathovars cannot be discriminated.

Pathogen Genotyping

Plant inspection can manage this level of discrimination.

On known host generally have limited possibilities

Extend arrays to characterise closely related bacteria.

- 1. Especially true for *Pseudomonas* and *Xanthomonas***
- 2. Multiple species/subspecies may exist on given host**
- 3. Detection of covert invasions – expect the unexpected**

Population diversity studies.

Contacts in COST873:

Alain Bultreys (*Pseudomonas*)

Charles Manceau (*Xanthomonas*)

David Stead

Marco Scortichini

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Host Genotyping

Resistance breeding and selection are key to COST873

Streamlining the screening process by starting with compatible cultivars that can be used in IPM orchards

Example from COST853:

Cherry chip for host-compatibility

F. Pasquier, Agroscope Changins-Wädenswil, Switzerland

Other host species?

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Contacts in COST873:

Diego Frutos (Nuts)

Emilio Stefani (Fruits)

Transcriptomics

Molecular Plant-Microbe Interactions can reveal critical virulence/resistance traits

Exploit these as targets for novel plant protection strategies

**Genomes are expected to be sequenced in COST873:
e.g. *Xanthomonas arboricola* pv. *pruni***

Contacts in COST873:

John Elphinstone

Brion Duffy

Emilio Stefani

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How can you get involved?

COST873 welcomes experts from COST853 to join!

www.COST873.ch



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Register Online!

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Welcome

COST 873 is a European network of scientists, industry and plant protection specialists dedicated to developing proactive solutions to bacterial diseases of stone fruits and nuts. Eighteen countries have signed the Action with more expected. Any specialist from a COST country is invited to join. [Our Mission](#)

Upcoming Meetings

17-19.04.2007, WG1/WG2 Joint Meeting, Angers, France [Info](#)
09.2007, WG3/WG4 Joint Meeting, Spain [Info](#)

10.2007 (tentative), Committee of Practitioners Meeting, Luzern, Switzerland [Info](#)

Current Projects

Special Task Force 1.1 - Developing a diagnostic protocol for *Xanthomonas arboricola* pv. *pruni*. Marco Scortichini is the Head of STF1.1, which is dedicated to producing a validated molecular diagnostic test for this stone fruit disease.

Plant-Inspection-on-a-Chip - This is a Swiss funded project (2005-2007) in cooperation with COST 853 aimed at designing a microarray platform for simultaneous detection of a wide range of EPPO quarantine bacteria, including several stone fruit and nut pathogens.

People



Dr. Brion Duffy, Switzerland

Brion is a plant pathologist who has been based since 2002 at the Agroscope Changins-Wädenswil, Swiss Federal Research Station, near Zürich, Switzerland. His current research program focuses on designing sustainable control strategies for stone fruit and pome fruit bacterial diseases, particularly those caused by quarantine pathogens. This includes everything from monitoring/detection, biocontrol, chemical control, and host resistance. He also has a food safety research program devoted to preventing contamination of fresh fruits and vegetables by foodborne bacterial pathogens such as *Salmonella* and *Listeria*.

Latest Reports

-  [Annual report 2007 \(written\)](#)
-  [Annual report 2007 \(slide show\)](#)