FORWARD

A word about the maps and information herein: We have made every attempt to be as accurate and up-to-date as possible. As such we have established the following criteria:

1. Confirmed vector: This is an insect species that was proven to transmit phytoplasma to the host plant in that country *by transmission trials*. For example, a confirmed vector in a southern European country may not necessarily be a vector in a northern European country. At best its status would be suspected vector.

2. Suspected vector: This is a vector that may be suspected because it is a vector in another country. Often times an insect testing positive by PCR is considered suspected vectors when, in fact, we can only say accurately state that it recently fed on an infected plant.

3. We consider the scientists contributing information to be the most knowledgeable about the situation in their country and did not challenge the information even if there is a publication to the contrary. However, if we know that transmission tests were not conducted, we considered the insect to be a potential vector. This is a conservative approach, but reduces the chances of errors.

4. Black hatch marks indicate areas where there is no phytoplasma in economic plants/crops. This is a proactive determination; i.e., surveys were actively taken and analyzed. It is not the case that no phytoplasma has yet to be reported. This situation can arise because: 1. there are no crops in the area, 2. there are no vectors, 3. no infected plant material has been imported to the area, or 4. Intensive eradication efforts have been and are being conducted.

As with any project of this type, it is a work in progress and we do not consider it 'finished'. Anyone wishing to contribute information either from a country not represented or to add to information for an existing country, please send the information to phyllisw@volcani.agri.gov or barbara.jarausch@agroscience.rlp.de.

The maps below will be followed by detailed country information (see next page). Simply click on the map or country to see the information.

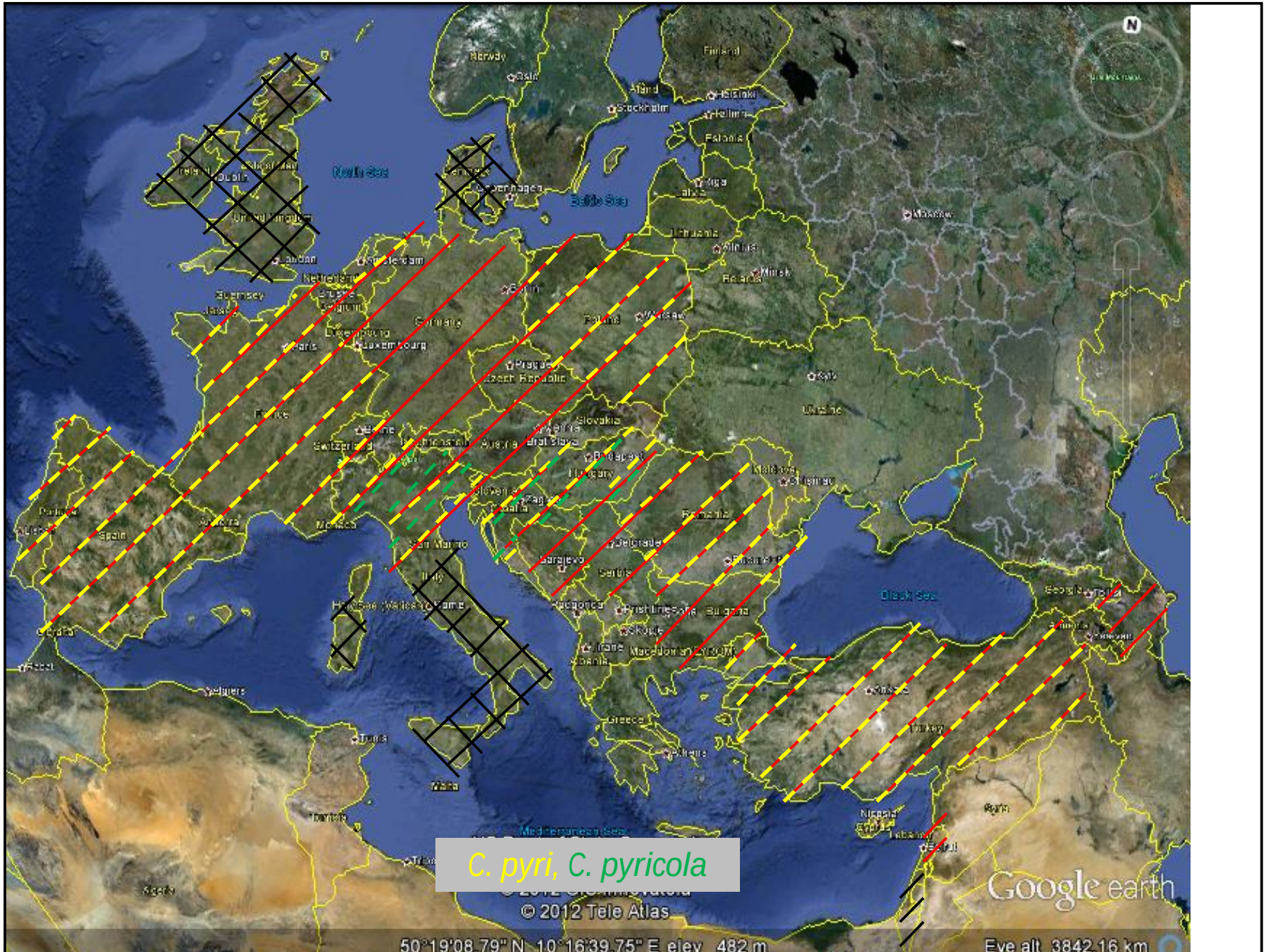
Country Information

Austria
Azerbaijan
Belgium
Bosnia & Herzegovina
Bulgaria
Croatia
Czech Republic
Denmark
Finland
France
Germany
Hungary
Iran
Israel
Italy
Lebanon
Norway
Poland
Portugal
Romania
Russia
Serbia
Slovenia
Spain
Switzerland
The Netherlands
Turkey
United Kingdom

Apple Proliferation (—) Confirmed *Cacopsylla* vectors

ESFY ( ) Confirmed *Cacopsylla pruni* ( ) vector

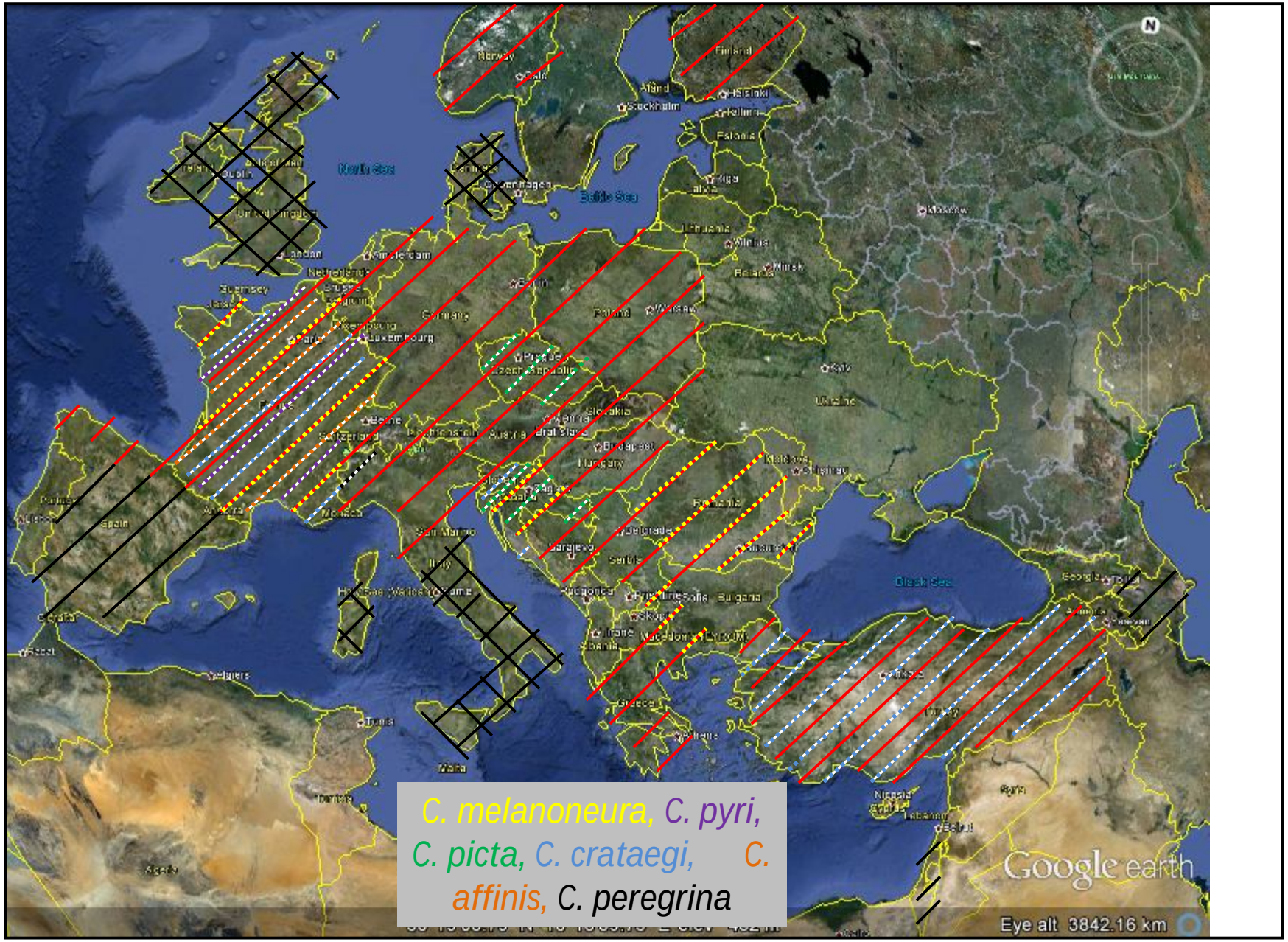
Pear Decline (——) Confirmed *Cacopsylla* vectors



Bois Noir (——) – *Hyalesthes obsoletus* (w/o pathogen- - -)

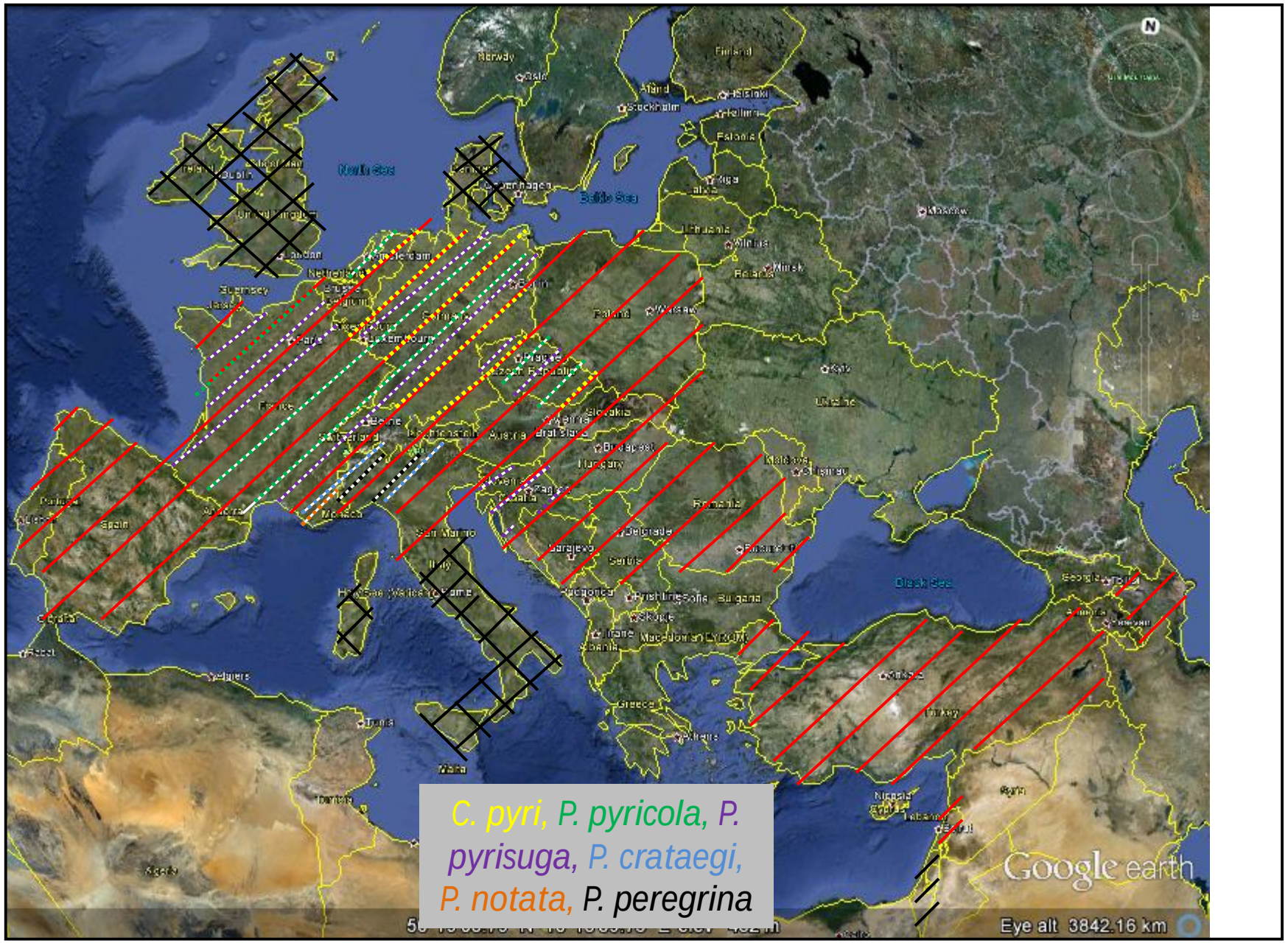
Flavescence Doree (—) – *Scaphoideus titanus*

Apple Proliferation (—) Suspected *Cacopsylla* vectors



ESFY (——) Suspected *Cacopsylla* vector

Pear Decline (—) Suspected *Cacopsylla* vectors



COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
Institute for Plant Health contact: Dr. Christa Lethmayer	AGES Institute for Plant Health Spargelfeldstraße 191 A-1220 Vienna AUSTRIA	pflanzengesundheit@ages.at / ++43/50555/33326 and christa.lethmayer@ages.at / ++43/50555/33311

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Vienna, Lower Austria, Burgenland, Styria	'*Candidatus* Phytoplasma prunorum'	unknown	European Stone Fruit Yellows	widespread	*Prunus armeniaca*, *Prunus persica*	earlier bud break, leaf development before blossom, leaf rolling, reduced leaf size, dieback, tree decline	PCR, RFLP
Vienna, Lower Austria, Styria, Burgenland, Upper Austria	'*Candidatus* Phytoplasma pyri'	unknown	Pear decline	widespread	*Pyrus communis*	reddening of leaves, chlorotic leaves, dieback, tree decline	PCR, RFLP
Austria	'*Candidatus* Phytoplasma mali'	unknown	Apple proliferation	widespread	*Malus domestica*	reduced fruit size, witches broom	PCR, RFLP
Vienna, Lower Austria, Styria, Burgenland, Carinthia	Stolbur phytoplasma	Stolbur tuf-type II	Boir noir	widespread	*Vitis vinifera*, herbaceous plants	yellowing, reddening of leaves, leaf rolling, unripened green shoots, shrivelled grapes, black shoots and pustules	PCR, qPCR, RFLP
Styria	'*Candidatus* Phytoplasma vitis	FD-C	Grapevine flavescence dorée	localised	*Vitis vinifera*, *Clematis vitalba*	yellowing, reddening of leaves, leaf rolling, unripened green shoots, shrivelled grapes, black shoots and pustules, growth reduction, decline, triangular leaves	PCR, qPCR, RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (acknowledged)	**Vectors (putative)**	**Population density #**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
	Cacopsylla pruni	moderate/high	'*Candidatus* Phytoplasma prunorum'	unknown	PCR, RFLP	*Prunus armeniaca*, *Prunus domestica*, *Prunus spinosa*	beating tray method	morphological identification
	Cacopsylla pyri	high	'*Candidatus* Phytoplasma pyri'	unknown	PCR, RFLP	*Pyrus communis*	beating tray method	morphological identification
	Cacopsylla pyricola	high	'*Candidatus* Phytoplasma pyri'	unknown	PCR, RFLP	*Pyrus communis*	beating tray method	morphological identification
	Cacopsylla pyrisuga	moderate	'*Candidatus* Phytoplasma pyri'	unknown	PCR, RFLP	*Pyrus communis*	beating tray method	morphological identification
	*Cacopsylla melanoneura**	high	'*Candidatus* Phytoplasma mali'	unknown	PCR, RFLP	*Malus domestica*, *Crataegus* sp.	beating tray method	morphological identification
	*Cacopsylla picta**	low	'*Candidatus* Phytoplasma mali'	unknown	PCR, RFLP	*Malus domesticus*	beating tray method	morphological identification
Hyalesthes obsoletus		low/moderate	Stolbur phytoplasma	low/moderate	PCR	herbaceous plants	yellow sticky traps	morphological identification
	Anaceratagallia ribauti	low	Stolbur phytoplasma	unknown	PCR	herbaceous plants	suction trap method, yellow sticky traps	morphological identification
Scaphoideus titanus		low/moderate	'*Candidatus* Phytoplasma vitis'	0%	PCR, realtime PCR	*Vitis vinifera*	yellow sticky traps	morphological identification

* … PCR-analysis in progress
# … attention: results of population density are influenced by sampling date (and method) of catches!

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Steffek, R. & Altenburger J. (2008): Eine Quarantänekrankheit erkennen: Dem Birnenverfall auf der Spur. - Besseres Obst 9, 4-5.

Zeisner, N. (2005): Amerikanische Rebzikaden im Anflug. - Der Winzer, 20-21.

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Zeisner, N. (2008): Occurrence and spread of *Scaphoideus titanus* in Austria. In: Lozzia, G. C., Lucchi, A., Di Chiara, S. R. & Tsolakis, H. (Eds.): Proceedings of the Working Group “Integrated Protection in Viticulture”-meeting at Marsala (Sicily, Italy), 25-27 October, 2007. - IOBC/wprs Bulletin Vol. 36, 375-377.

COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
PhD student Gulnara Balakishiyeva Institute of Botany, Azerbaijan National Academy of Sciences Badamdar Shosse 40, AZ 1073, Baku, Azerbaijan	Azerbaijan	E-mail : gbalakishiyeva@yahoo.com TEL: +994 125381164; +994 556730346 FAX: +994 125102433

Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Azerbaijan/Guba region Azerbaijan/Sheki region Azerbaijan/Absheron peninsula	'*Ca.* P. solani'	AZ3-Ce Pv1.AZ Au3.AZ Nef40.AZ To41.AZ To42.AZ	Stolbur		*Prunus avium* *Capsicum annuum* *Solanum melanogera* *Mespilus germanica* *Solanum lycopersicum*	yellowing yellowing leaf roll flower malformation, leaf reddening	16S-rDNA nested PCR with the primers R16mF2 / R16mR1 and R16F2n / R16R2
Azerbaijan/Guba region	'*Ca.*P.brasiliense'	PEACH19.AZ	Witches' broom		*Prunus persica*	Leaf yellowing, leaf roll	same
Azerbaijan/Guba region Azerbaijan/Absheron peninsula	'*Ca.* P. pyri'	PD36.AZ PD43.AZ Poi11.AZ Poi45.AZ	Pear decline		*Pyrus communis*	leaf reddening, decline	same
Azerbaijan/Guba region Azerbaijan/Absheron peninsula	'*Ca.*P. prunorum'	Azer4 Azer10 Prm01.AZ	European stone fruit yellows		*Prunus armeniaca* *Prunus domestica* *Prunus cerasifera*	leaf yellowing	same

Publications:

1. Balakishiyeva, G., Danet, J.L., Qurbanov, M., Mamedov, A., Khey-Pour, A., and Foissac, X. (2012) First report of phytoplasma infections in several temperate fruit trees and vegetable crops in Azerbaijan. Journal of Plant Pathology *in press, accepted in 2009*.
2. Balakishiyeva G., Gurbanov M., Mammadov A., Bayramov S., Aliyev J., and Foissac X. (2011). Detection of "Candidatus Phytoplasma brasiliene" in a new geographic region and existence of two genetically distinct populations. *European Journal of Plant Pathology*, 130:457–462.
3. Danet J.L., Balakishiyeva G., Cimerman A., Sauvion N., Marie-Jeanne V., Labonne G., Laviña A., Batlle A., Križanac I., Škorić D., Ermacora P., Ulubaş Serçe C., Caglayan, K., Jarausch, W., Foissac, X. (2011) Multilocus sequence analysis reveals the genetic diversity of European fruit tree phytoplasmas and the existence of inter species recombination. *Microbiology* 157: 438 - 450.
4. Fabre, A., Balakishiyeva, G., Ember, I., Acs, Z., M. Kölber, M., Danet, J.-L., and Foissac, X. (2011a) Heterologous expression and genetic diversity of StAMP the antigenic membrane protein of stolbur phytoplasma. In Second European Bois Noir Workshop. Angelini, E. (ed). Castelbrando - Cison di Valmarino (TV) , Italy: Coop. libraria editrice Universita di Padova to be lateron published in *Petria*, p. 79.
5. Balakishiyeva G., Gurbanov M., Mammadov A., Bayramov S., Aliyev J., and Foissac X. (2011). Detection of 'C*andidatus* Phytoplasma brasiliense' in a new geographic region and existence of two genetically distinct *dna*K genotypes. *Bulletin of Insectology 64 (Supplement ISSN 1721-8861): S61-S62.*
6. A. Fabre, G. Balakishiyeva, I. Ember, A. Omar, Z. Acs, M. Kölber, L. Kauzner, M. Della Bartola, J-L. Danet, X. Foissac (2011) StAMP encoding the antigenic membrane protein of stolbur phytoplasma is useful for molecular epidemiology. *Bulletin of Insectology 64 (Supplement ISSN 1721-8861): S21-S22.*

COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

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Your address		
Name	**Institution country/region**	**email / telephone**
Tim Belien	Department of Zoology, pcfruit vzw Sint-Truiden Belgium	Tim.belien@pcfruit.be

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
	C. picta, C. melanoneura, C. affinis, C. crataegi, C. pyri		AP					
	C . pyri, C. pyricola C. peregrine, C. crataegi		PD					

Publications:

COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
Duška Delić	University of Banjaluka, Faculty of Agriculture/Bosnia and Herzegovina B&H	duskadelic@hotmail.com Tel: +387 (0) 51 330 978 (Natasa)

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
South-part of B&H, Trebinje (Arandjelovo)	'*Ca*. P. vitis'		FD	present in area where FD had never previously been recorded in grapevine	*Clematis vitalba*	no phytoplasma symptoms	nested PCR + RFLP
winegroving in east and west Herzegovina and around Gradiska	BN phytoplasma	Tuf type-b	BN	widespread in Herzegovina vineyards.	*Vitis vinifera*	sectorial leaf reddening and yellowing, unregulare lignification of canes, berry drying, updown rolling of the leaves	nested PCR+ RFLP
weeds phauna around vineyard in Sarajevo	stolbur phytoplasma		'*Candidatus* Phytoplasma convolvuli'		*Convolvulus arvensis*	proliferation of plant leavs petiols	nested PCR+ RFLP
weeds phauna around vineyard in Sarajevo	stolbur phytoplasma		stolbur		*Daucus carota*	no specific symptoms	nested PCR+ RFLP
Infected areas: Banjaluka, Mostar	'*Ca*. P. prunorum'		ESFY	present in main frut trees growing areas in commerciall orchards	*Prunus persica*	leaf yellowing,	nested PCR + RFLP
	'*Ca*. P. prunorum'		ESFY		*Prunus armeniaca*	leaf and veon yellowing, leaf rolling in triangle	nested PCR + RFLP
	'*Ca*. P. prunorum'		ESFY		*Prunus salicina*	premature red color, leaf curling	real-time, nested PCR + RFLP
	'*Ca*. P. prunorum'		ESFY		*Prunus cerasifera*	premature red color, leaf curling	real-time PCR, nested PCR + RFLP
Infected areas: Banjaluka, Gradiska, Prjedor, Dubica, Maglaj, Sarajevo	'*Ca*. P. pyri'		PD	present in main pear trees growing areas in commerciall orchards	*Pyrus communis*	premature red color, leaf curling, premature leaf drop, line of necrotic tissue in the bark	nested PCR + RFLP
Infected areas: Banjaluka, Gradiska, Maglaj, Sarajevo	'*Ca*. P. mali'		AP	present in main apple trees growing areas in commerciall orchards in high incidence	*Malus domestica*	witches' broom at the end of shoots, enlarged stipules, early leaf reddening	nested PCR + RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
	Scaphoideus titanus			not detected yet		*Vitis vinifera*	yellow sticky traps	morphological
	Reptalus cuspidatus	widely distributed		not detected yet		herbaceous plants,	by sweep net sampling	morphological
	Dictyophara europea	widely distributed		not detected yet		*Clematis vitalba*, vitex, *Vitis vinifera*	by sweep net sampling	morphological
	Cacopsylla pruni	high, widely distributed	'*Ca*. P. prunorum'	moderate	nested PCR + RFLP	*Prunus* spp, especially *P. domestica*, *P. cerasifera* , *P. spinosa*	beating tray method	morphological
	Cacopsylla pyri	high, widely distributed	'*Ca*. P. pyri'	high	nested PCR + RFLP	*Pyrus communis*	beating tray method	morphological
	Cacopsylla picta	low to moderate, widely distributed	'*Ca*. P. mali'	high		*Malus domestica*	beating tray method	morphological
	Cacopsylla melaneura	low to moderate, widely distributed	'*Ca*. P. mali'	moderate		*Malus domestica*	beating tray method	morphological

Publications:

- Martini M., Marcone C., Mitrović J., Maixner M., Delić D., Myrta A., Ermacora P., Bertaccini A., Duduk B. 2012. '*Candidatus* Phytoplasma convolvuli', a new phytoplasma taxon associated with bindweed yellows in four European countries. IJSEM Papers in Press. Published January 13, 2012 as doi:10.1099/ijs.0.038612-0.
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- Delić D., Mehle N., Lolić B., Ravnikar M. Đurić G. 2010. Current status of European stone fruit yellows in Bosnia and Herzegovina: Julius-Kühn-Archiv , Procedeeng of *21st International Conference on Virus and other Graft Transmissible Diseases of Fruit Crops*, July 5-10 2009, Neustadt, Germany, Neustadt: Julius Kühn-Institut, 427: 415-417.
- Martini M.; Ferrini F.; Danet J.L.; Ermacora P.; Gülşen S.; Delić D.; Nazia L.; Xavier F.; Carraro L. 2010: PCR/RFLP based method for molecular characterization of "*Candidatus* Phytoplasma prunirum" strains using *aceF* gene: Julius-Kühn-Archiv , Procedeeng of *21st International Conference on Virus and other Graft Transmissible Diseases of Fruit Crops*, July 5-10 2009, Neustadt, Germany, Neustadt: Julius Kühn-Institut, 427: 386-391.
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- Delić D., Martini M., Ermacora P., Carraro L., Myrta A.. 2005. First report of fruit tree phytoplasmas and their psyllid vectors in Bosnia and Herzegovina. *Journal of Plant Pathology* 87: 143-144. ISSN 1125-4653 [COBISS.SI-ID 1125-4653, Societa italiana di patologia vegetale]
- Martini M., Ermacora P., Delić D., Moruzi S., Loi N., Carraro L. 2005. Spreading and characterization of '*Candidatus* Phytoplasma mali ' subtypes in different apple growing areas. *Petria* 15 (1/2), 105-106. ATTI *3º Incontro Nazionale sulle Malattie da Fitoplasmi*, Milano, 22-24 giugno 2005. [ISSN 1120-7698].
- Delić D., Lolić B. 2010. Bois noir phytoplasma infecting grapevine in Srpska (Bosnia and Herzegovina)*: Scientific meeting and 2nd Management Committee meeting,* January 31 to 2 February 2010, Sitges, Spain, COST FA0807, 10. ISBN-13: 978-84-692-98916

COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

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Working Group 2: Epidemiology and Vector Ecology **Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE**

Your address		
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Aneliya Etropolska	University of Forestry Bulgarian Food Safety Agency Bulgaria	anelia_etropolska@yahoo.de

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Kjustendil	Ca. P. mali Ca. P. pyri Ca. P. prunorum		Apple proliferation Pear decline ESFY		Malus domestica Pyrus communis Prunus persica		PCR
Blagoevgrad	Ca. P. mali Ca. P. pyri		Apple proliferation Pear decline		Malus Pyrus communis		PCR
Pazardjik	Ca. P. mali Ca. P. pyri Ca. P. prunorum		Apple proliferation Pear decline ESFY		Malus domestica Pyrus communis Prunus domestica Prunus armeniaca		PCR
Plovdiv	Ca. P. mali Ca. P. pyri		Apple proliferation Pear decline		Malus domestica Pyrus communis		PCR
Veliko Tarnovo	Ca. P. mali		Apple proliferation		Malus domestica		PCR
Ruse	Ca.P. pyri		Pear decline		Pyrus communis		PCR
Sliven	Ca.P. pyri		Pear decline		Pyrus communis		PCR
Yambol	Ca.P. pyri Ca. P. prunorum		Pear decline ESFY		Pyrus communis Prunus domestica		PCR
Dobrich	Ca. P. prunorum		ESFY		Prunus persica		PCR
Burgas	Ca.P. pyri Ca. P. prunorum		Pear decline ESFY		Pyrus communis Prunus domestica		PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla pruni (Kjustendil region and Sofia region)			Ca. “P. prunorum”	-	PCR	Prunus		

Publications:

Sommary results of monitoring of the distribution of fruit tree phytoplasmas in Bulgaria from 2007 until 2011 (COST FA0807, 8 June, Rome, 2012)
Anelia ETROPOLSKA[1,2], and Mariana Laginova[1]
[1]Bulgarian Food Safety Agency, 1040 Sofia, Bulgaria
[2]Department of Plant Protection, University of Forestry, 1756 Sofia, Bulgaria

Survey of psyllid vectors of fruit tree phytoplasmas in Bulgaria: a preliminary report (Bulletin of Insectology 64, 2011)
Anelia ETROPOLSKA[1,2], Barbara JARAUSCH[1], Georgi Trenchev[2], Wolfgang JARAUSCH[1]
[1]AlPlanta-IPR, RLP AgroScience, D-67435 Neustadt an der Weinstraße, Germany
[2]Department of Plant Protection, University of Forestry, 1756 Sofia, Bulgaria

Development of specific detection primers for '*Candidatus* phytoplasma pyri' (Bulletin of Insectology 64, 2011)
Anelia ETROPOLSKA[1,2], Barbara JARAUSCH[1], Michelle HERDEMERTENS[1], Wolfgang JARAUSCH[1]
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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Bulgaria	16SrXII		BN	Widespread	Grapevine	GY's	PCR
Bulgaria - Russe Plovdiv, Sliven Pazardjik, Kjustendil, Bourgas	16SrX		PD	Limited	pear		PCR
Bulgaria – Pazardjik, Yambol, Silistra, Bourgas	16SrX		ESFY	Limited	prunus		PCR
Bulgaria - Plovdiv, Pazardjik, Kjustendil, Bourgas	16SrX		AP	Limited	apple		PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
Hyalestes obsoletus		Widespread	Stolbur (BN)	middle	PCR	Tomato, cherry, peper, potato, weeds, grapevine	Yellow traps	Morphological
Scophoideus titanus		North Bulgaria only	No	No	PCR	Grapevine	Yellow traps	Morphological
Cacopsylla		No data or or beginner	ESFY, PD, AP				Traps	Morphological

Publications:

Avramov Z., Gillet J., Laginova M., 2008. First Detection of Stolbur Phytoplasma in Grapevines (*Vitis vinifera* cv. Merlot) Affected with Grapevine Yellows in Bulgaria. *Journal of Phytopathology*, **156**, 112 – 114.

Avramov Z., Ivanova I., Laginova M., 2011. Screening for phytoplasma presence in leafhoppers and planthoppers collected in Bulgarian vineyards, *Bulletin of Insectology* **64** (Supplement), 115-S116.

Topchiiska M., Sakalieva D., 2001. Detection of Pear decline phytoplasma by Polymerase chain reaction in Bulgaria, *Bulgarian Journal of Agricultural Science*, **7**, 611 – 614.

Topchiiska M., Sakalieva D., 2002. PCR procedure for detection and identification of European stone fruit yellows (ESFY) phytoplasma on tree of Prunus varieties, *Bulgarian Journal of Agricultural Science*, **8**, 19-22.

ETROPOLSKA A., JARAUSCH B., HERDEMERTENS M., JARAUSCH W., 2011. Development of specific detection primers for 'Candidatus phytoplasma pyri', 87-88. Bulletin of Insectology **64** (Supplement) Second IPWG Meeting

AVRAMOV Z., CONTALDO N., BERTACCINI A., SAKALIEVA D., 2011. First report of stolbur phytoplasmas in Prunus avium in Bulgaria, 71-72, *Bulletin of Insectology* **64** (Supplement) - Second IPWG Meeting

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Your address		
Name	**Institution country/region**	**email / telephone**
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Presence of phytoplasma diseases detected in your country/region							
Region/s*	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Croatia	BN		BN	high, widespread	Grapevine, *Convolvolus arvensis, Senetio vulgaris, Stellaria media, Taraxacum officinale, Polygonum lapathifolium, Plantago lanceolata, Plantago media,* pear, apple, apricot, peach, sweet cherry	Yes, on cultivated plants	Molecular (PCR/RFLP, real-time PCR, sequencing)
Central and northwestern regions of Croatia (counties Zagrebačka, Koprivničko-križevačka and Sisačko-moslavačka)	FD	16SrV-C subgroup, FD2 and FD3 clusters (*map* gene typing)	FD	present in some areas	Grapevine, *Clematis vitalba*	yes	Molecular (PCR/RFLP, real-time PCR, sequencing)
Central, northwestern, eastern and southern regions of Croatia (counties Zagrebačka, Osječko-baranjska, Virovitičko-podravska, Varaždinska and Dubrovačko-neretvanska)	AP		AP	present in some areas	apple	yes	Molecular (PCR/RFLP
Central, northwestern, eastern and southern regions of Croatia (counties Zagrebačka, Osječko-baranjska, Sisačko-moslavačka, Varaždinska and Splitsko-dalmatinska)	PD		PD	present in some areas	pear	yes	Molecular (PCR/RFLP)
Central, eastern and western regions of Croatia (counties Zagrebačka, Osječko-baranjska, Požeško-slavonska, Primorsko-goranska and Istarska)	ESFY		ESFY	present in some areas	apricot, peach, Japanese plum, wild *Prunus*	yes	Molecular (PCR/RFLP)

*if county is not specified, the disease is widespread

Phytoplasma vectors (putative/acknowledged) identified in your country/region	

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Scaphoideus titanus Ball		Population density was variable, from very high to just a few individuals depending on regime of chemical protection against other pests	FD	In 2011 survey the infection rate was 33% (11/33), while in previous years no phytoplasma positive insects were detected	Molecular (PCR/RFLP, real-time PCR, sequencing)	grapevine	entomological net	morphological
Hyalesthes obsoletus Signoret		Higher numbers of *H. obsoletus* were caught in vineyards in which nettles (*Urtica dioica*) are dominant weed species.	BN	In 2011 survey the infection rate was 20,8% (5/24), while in some previous surveys number of tested individuals was not enough to determine the infection rate.	Molecular (PCR/RFLP, real-time PCR, sequencing)	Grapevine	entomological net	morphological
	Reptalus panzeri *Reptalus cuspidatus* *Reptalus quinquecostatus*	Low - medium	BN	-	Molecular (PCR/RFLP, real-time PCR)	grapevine	entomological net	morphological

Cacopsylla melanoneura Forster	*C. crataegi*	Low-number populations were present. The regime of chemical protection greatly affects the population density of psyllids.	AP	-		Apple	entomological net	morphological
Cacopsylla picta Forster		Low-number populations were present. The regime of chemical protection greatly affects the population density of psyllids.	AP	-		Apple	entomological net	morphological

Cacopsylla pyri Linnaeus		It was present in high-number populations mainly in the intensive production pear orchards	PD, BN	Number of tested individuals is not enough to determine the infection rate. Few insects tested positive.	Molecular (PCR/RFLP)	Pear	entomological net	morphological
Cacopsylla pyricola Forster		It was present in low-number populations only in the extensive pear orchards.	BN	-	Molecular (PCR/RFLP)	Pear	entomological net	morphological

	Cacopsylla pyrisuga	It was present in low-number populations	PD, BN	Number of tested individuals is not enough to determine the infection rate. Few insects tested positive.	Molecular (PCR/RFLP)	Pear	entomological net	morphological
Cacopsylla pruni Scopoli		Low-number populations were present. The regime of chemical protection greatly affects the population density of psyllids.	ESFY	Number of tested individuals is not enough to determine the infection rate. Few insects tested positive.	Molecular (PCR/RFLP)	Stone fruits (plum, apricot, peach) and wild *Prunus* species (*Prunus cerasifera*, *Prunus spinosa*)	entomological net	morphological
	Empoasca decedens	It was present in high-number populations only in Istarska county	ESFY	-		peach	entomological net	morphological

Publications:

Danet JL, Balakishiyeva G, Cimerman A, Sauvion N, Marie-Jeanne V, Labonne G, Lavina A, Batlle A, Krizanac I, Skoric D, Ermacora P, Ulubas Serce C, Caglayan K, Jarausch W and Foissac X. (2011). Multilocus sequence analysis reveals the genetic diversity of European fruit tree phytoplasmas and the existence of inter species recombination. Microbiology 157: 438- 450.

Šeruga Musić M, Škorić D, Haluška I, Križanac I, Plavec J, Mikec I (2011). First Report of Flavescence Dorée-Related Phytoplasma Affecting Grapevines in Croatia. Plant Disease 95: 353.

Šeruga Musić M, Pušić P, Fabre A, Škorić D, Foissac X (2011). Variability of stolbur phytoplasma strains infecting Croatian grapevine by multilocus sequence typing. Bulletin of Insectology 64: S39-40.

Škorić D, Šeruga Musić M, Plavec J, Križanac I (2011). Geographical distribution of 'flavescence dorée' phytoplasmas in Croatian grapevines. Bulletin of Insectology 64: S243-244.

Križanac I, Budinščak Ž, Šeruga Musić M, Škorić D (2010) Diversity of phytoplasmas infecting fruit trees and their vectors in Croatia. J Plant Dis Prot 117 (5): 206-213.

Šeruga Musić M, Škorić D, Budinščak, Ž, Križanac I, Mikec, I (2009) Survey of phytoplasma diversity in heavily grapevine yellows affected areas of Croatia. Le Progres Agricole et Viticole. Hors Serie 206-207

Križanac I, Mikec I, Budinščak Ž, Šeruga Musić M, Krajačić M, Škorić D (2008) Pomaceous fruit tree phytoplasmas and their potential vectors in Croatia. Acta Horticulturae 781: 477-482

Ćurković Perica M, Škorić D, Šeruga M, Kozina B, Krajačić M (2001) Recent progress in phytoplasma research in Croatian vineyards. Agric conspec sci 66(1): 65-68

Mikec I, Križanac I, Budinščak Ž, Šeruga Musić M, Krajačić M, Škorić D (2006) Phytoplasmas and their potential vectors in vineyards of indigenous Croatian varieties. Extended abstracts 15th Meeting ICVG. Stellenbosch, South Africa, 3-7 April 2006: South African Society for Enology and Viticulture. pg 255-257

Šeruga M, Ćurković Perica M, Škorić D, Kozina B, Mirošević N, Šarić A, Bertaccini A, Krajačić M (2000) Geographic distribution of Bois Noir phytoplasmas infecting grapevines in Croatia. J Phytopathol 148(4): 239-242

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Your address		
Name	**Institution country/region**	**email / telephone**
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Presence of phytoplasma diseases detected in your country/region							
Region/s	***Phytoplasma/s***	***Strain/s***	***Phytoplasma disease***	***Incidence***	***Host/s***	***Symptoms***	***Detection method/s***
	Aster yellows 16SrI-B				*Allium porrum* *Allium altyncolicum* *Bellis perennis* *Brassica napus* subsp. *napus* *Brassica oleracea* subsp. *botrytis* *Callistephus chinensis* *Cirsium arvense* *Daphne mezereum* *Erigeron strigosus* *Fragaria ananassa* *Helichrysum bracteatum* *Chenopodium album* *Lactuca sativa* var. *capitata* *Lilium sp.* *Limonium sinuatum* *Malus domestica* *Matricaria chamomilla* *Nigella damascena* *Plantago lanceolata* *Plantago media* *Rehmania glutinosa* *Ribes rubrum* *Solanum tuberosum* *Tagetes erecta* *Tagetes patula* *Taraxacum officinale* *Thlaspi arvense* *Tillia cordata* *Tillia tomentosa* *Trifolium hybridum* *Trifolium pratense* *Tripleurospermum maritimum* *Verbascum densiflorum*		**PCR**
	Aster yellows 16SrI-C				*Fragaria ananassa* *Fragaria vesca semperflorens* *Lilium martagon* *Malus domestica*		PCR

					Pyrus communis *Ribes rubrum* *Rosa* sp. *Tragopogon pratensis* *Trifolium hybridum* *Trifolium pratense* *Trifolium repens* *Echinacea purpurea*		
	X – disease 16SrIII - B				*Callistephus chinensis* *Trifolium hybridum* *Trifolium pratense*		PCR
	Elm yellows 16SrV-A				*Ulmus carpinifolia*		PCR
	Elm yellows 16SrV-C				*Rubus idaeus*		PCR
	Apple proliferation 16 SrX - A				*Malus domestica* *Ribes rubrum* *Trifolium pratense*		PCR
	Apple proliferation 16SrX - B				*Cerasus avium* *Cerasus vulgaris* *Prinus amygdalus x cerasifera* *Prunus armeniaca* *Prunus cerasifera* *Prunus domestica* *Prunus persica* *Prunus brigantine x P. armeniaca* *Prunus salicina x cerasifera*		PCR
	Apple proliferation 16SrX - C				*Pyrus communis*		PCR
	Stolbur 16SrXII				*Amaranthus retroflexus* *Apium graveolens* var. *rapaceum* *Calystegia sepium* *Capsinum annuum* *Cirsium arvense* *Convolvulus arvensis* *Datura stramonium* *Lycopersicon esculentum* *Solanum melongena* *Solanum nigrum*		PCR

					Solanum tuberosum *Trifolium pratense* *Urtica dioica* *Vitis vinifera*		
All over	ESFY			Higher in SE			

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Hyalesthes obsoletus Signoret		low	Stolbur		PCR	*Apium graveolens* var. *rapaceum* *Lycopersicon esculentum*	sweeping	morphology
	Lygus spp.	high	Stolbur		PCR	*Lycopersicon esculentum*	sweeping	morphology
C. pruni		Higher in SE	ESFY		PCR			
C. picta			AP		PCR			

Publications:

Milena Březíková and Šárka Linhartová: First Report of Potato Stolbur Phytoplasma in Hemipterans in Southern Moravia, Plant Protection Science, Volume **43 ,**Issue **2,2007**

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Your address		
Name	**Institution country/region**	**email / telephone**
Mogens Nicolaisen	Department of Integrated Pest Management, Research Centre Flakkebjerg, Denmark	

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s

I am not aware of any surveys carried out in Denmark nor any reported problems caused by the listed phytoplasmas, so their status in Denmark is unknown, however I am sure they are not causing any significant problems

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Your address

Name	Institution country/region	email / telephone
Anne Lemmetty	MTT Agrifood Research Finland FI-31600 Jokioinen Finland	anne.lemmetty@mtt.fi +358 29531 7456

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Southern Finland	'*Ca.* P. asteris' 16SrI-A		Aster yellows	20%	*Daucus carota*	leaf curling and discoloration	nested-PCR RFLP, sequencing
Southwestern Finland	'*Ca*. P. mali' 16SrX-A	AT-1, AT-2	Apple proliferation	11.4%	*Cacopsylla picta*		PCR-RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
	Cacopsylla picta		'*Ca*. P. mali'		PCR-RFLP	*Malus domestica, Picea abies*	beating net	morphological means

Publications:

Lemmetty, A., Tuovinen, T. & Kemppainen, R. 2011. '*Candidatus* Phytoplasma mali' infected *Cacopsylla picta* found in apple orchards in South-Western Finland. Bulletin of Insectology 64 (Supplement):257-258.

Munyaneza, J.E., Lemmetty, A., Nissinen, A.I., Sengoda, V.G. and Fisher, T.W. 2011. Molecular detection of aster yellows phytoplasma and '*Candidatus* Liberibacter solanacearum' in carrots affected by the psyllid *Trioza apicalis* (Hemiptera: Triozidae) in Finland. Journal of Plant Pathology 93 (3): 697-700.

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Your address

Name	Institution country/region	email / telephone
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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
In all french vineyards	stolbur	Tuf type I and II	Bois noir	Low to high	*Vitis vinifera*	**Grapevine yellows**	**RFLP**

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Hyalesthes obsoletus		Low to high	stolbur	Roughly, from 0 to 50%	RFLP	Stinging nettle or field bindweed	Aspiration or yellow sticky traps	Confirmation by entomologist/ comparison to specimens

Publications:

Kuntzmann P., Caillods F., Renel C., Villaumé S., 2008. Some indications about compared evolution of Bois noir disease incidence in vines and density of stinging nettle related *Hyalesthes obsoletus* populations in Alsace. First European Bois noir workshop 2008 , Weinsberg - Germany , 11-13 november 2008.

Kuntzmann P., Beccavin I., Coarer M., Garcia., Lecareux C., Mejean I., Molot B., Pain A., Paupelard L., Renard I., Savarit P., Vandelle M.-C., Viguès V., 2008. Stolbur isolates in grapevine and vector *Hyalesthes obsoletus* in France. First European Bois noir workshop 2008 , Weinsberg - Germany , 11-13 november 2008.

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Kuntzmann P., Bogen E., Renel C., 2008. Bois noir disease of the grapevine in Alsace: field transmission, observations made on symptomatology and reduction of transmission risk by the vector *Hyalesthes obsoletus* Signoret. IOBC/WPRS working group “Integrated Protection in Viticulture” Proceedings of the meeting at Marsala, Sicily, Italy, 25-27 october 2007, 36,2008 : 127-136

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Your address		
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Presence of phytoplasma diseases detected in your country/region							
Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
all	Ca P. prunorum		ESFY	High (Sauvion pers. com.) ; major limiting factor in the production of apricots and Japanese plums	*Prunus armeniaca, P. salicina, P. domestica, P. persica, P. amygdalus, P. spinosa, P. cerasifera*	Classical : off-season growth and premature break of leaf buds before flowering in late winter ; during summer, the leaf roll upward etc (for more details EPPO website)	PCR, specific primers : ESFYf/r (Yvon et al. 2009)
all	Ca. P pyri		PD	Weak ;	Cultivated *Pyrus* ; wild *Pyrus* ?	Classical (see EPPO website)	Universal PCR and sequencing (see Danet et al 2011)
all	Ca. P mali		AP	Weak (CTIFL 2010, questionnaire to the professionals)	Cultivated *Malus* ; wild *Malus* ? *Crataegus* ?	Classical (see EPPO website)	AP3-AP4 PCR (see Danet et al 2011)
	Ca. P. rhamni		buckthorn witches'-broom (BWB)	unknown	*Rhamnus catharticus* (buckthorn)		Universal PCR (Marcone et al 2004)
	Ca. P. spartii		Spartium witches'-broom (SpaWB),	unknown	*Spartium junceum* (Spanish broom),		Specific primers (Marcone et al 2004)
	Ca.P. allocasuarinae		allocasuarina yellows (AlloY)	unknown	*Allocasuarina muelleriana* (Slaty she-oak),		Specific primers (Marcone et al 2004)

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla pruni “B” Cacopsylla pruni “A” (Sauvion 2007, 2010)		Variable, but generally high. Widespread in France	Ca. P prunorum	Mean 1-3% ; in some localities > 20%	PCR, specific primers : ESFY f/r (Yvon et al. 2009)	Wild Prunus (P. spinosa, P. cerasifera) ; rarely cultivated Prunus	Beating method	Diagnostic PCR (specific molecular markers)
	C. pulchella	Very high in South of France	Ca. P prunorum	Never tested		Cercis siliquastrum	Beating method	Morphology
Cacopsylla pyri		Common, widespread	Ca. P pyri	Tested ?		Pyrus communis	Beating method	Morphology
	Cacopsylla pyricola	Unknown, but widespread	Ca. P pyri	unknown		Cultivated and wild Pyrus, Mespilus	Beating method	Morphology
	Cacopsylla pyrisuga	Weak, widespread	Ca. P pyri	unknown		Pyrus sp.; Malus domestica ?	Beating method	Morphology
	Cacopsylla bidens	Rare, outh of France	Ca. P pyri	unknown		Pyrus communis, P. pyraster and P. syriaca.	Beating method	Morphology
	Cacopsylla notata	Rare, south of France	Ca. P pyri	unknown		Pyrus sp.	Beating method	Morphology
	Cacospylla melanoneura	Very high, widespread	Ca. P mali	unknown	-	Malus ? Pyrus ? Crataegus ; conifers	Beating method	Morphology ; molecular markers
	Cacopsylla affinis	Weak, widespread	Ca. P mali	unknown		Crataegus sp. ; conifers	Beating method	Morphology; molecular markers
	Cacopsylla picta	Weak, south of France	Ca. P mali	unknown	-	ConifersMalus ?	Beating method	Morphology
	Cacopsylla crataegi	Common, widespread	Ca. P mali	unknown		Crataegus sp. ; conifers	Beating method	Morphology
	Cacopsylla peregrina	weak	Ca. P mali	unknown		Crataegus sp. ; conifers	Beating method	Morphology
	Cacopsylla pyri	Very common	Ca. P mali	unknown	-	Cultivated and wild Pyrus.	Beating method	Morphology

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
	Cacopsylla alaterni	Very high on Rhamnus alaternus in South of France	Ca P rhamni	?		Rhamnus alaternus		
	Cacopsylla rhamnicola	Very high on Rhamnus alaternus in South of France	Ca P rhamni	?		Rhamnus alaternus		
	Cacopsylla suturalis	? new species in France, described in Hautes-Pyrénées	Ca P rhamni			Rhamus alpina ; Rhamnus cathartica in Yugoslavia		
	Livilla spectabilis	Described in South of France	Ca. P spartii			Spartium junceum		
	Livilla smyrnensis	Unknown in France, described in Turkey	Ca. P spartii			Genista sp.		
	Aacanthocnema casuarinae	Unknown in France, described in Australia	Ca.P. allocasuarinae			Casuarina distyla		
	Aacanthocnema dobsoni	Unknown in France ; described in Australia	Ca.P. allocasuarinae			Allocasuarina verticillata		

Publications:

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
widespread	Ca. P. mali	Subtypes AP, AT-1, AT-2	Apple proliferation	high	Malus spp.	Witches' brooms, enlarged stipules, small fruits	**PCR**
widespread	Ca. P. prunorum		European stone fruit yellows	locally high	Prunus spp. P. armeniaca, P. persica, P. domestica, P. spinosa, P. cerasifera	Early budbreak, conical chlorotic leafroll	PCR
widespread	Ca. P. pyri		Pear decline	locally high	Pyrus	Reddening, slow decline	PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
Cacospylla picta		low	Ca. P. mali	10%	PCR	Malus	Beat tray	Morphological and molecular (specific primers)
Cacopsylla pruni Type 'B'		widespread	Ca. P. prunorum	1-2%	PCR	Prunus spp.	Beat tray	Morphological molecular (specific primers)
not yet proven	Cacopsylla pyri C. pyricola C. pyrisuga	High low low	Ca. P. pyri	??		Pyrus	Beat tray	morphological

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology **Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE**

Your address		
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Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Palatinate, Germany	Stolbur (16SrXII-A)	Nettle-type (a)	Bois noir	frequent	Grapevine, Urtica dioica	**Yellowing or redding, downward rolling of leaves, dry inflorescences, shriveled bunches, immature canes**	**PCR**
Palatinate, Germany	Stolbur (16SrXII-A)	bindweed-type (b)	Bois noir	Not so frequent	Grapevine, Convolvulus arvensis	**Yellowing or redding, downward rolling of leaves, dry inflorescences, shriveled bunches, immature canes**	**PCR**
Palatinate, Germany	PGY (16SrV-C)	PGY	Bois noir	sporadic	Grapevine, Alnus glutinosa	**Yellowing or redding, downward rolling of leaves, dry inflorescences, shriveled bunches, immature canes**	**PCR**
Palatinate, Germany	Aster yellows group (presumable)	?? in work	Like Bois noir	One young vineyard	Grapevine	**Yellowing or redding, downward rolling of leaves, dieback of growth tips**	**PCR**

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (acknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
Hyalethes obsoletus		Sometimes high	Stolbur nettle- and bindweed type	Up to 33 %	PCR	Grapevine, Urtica dioica, Convolvulus arvensis	Yellow sticky trap	visual
Oncopsis alni		Low	PGY	??	PCR	Grapevine, Alnur glutinosa	Spoon net	visual

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Maixner, M., Reinert, W., Darimont, H. (2000)
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WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
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Your address		
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Please find below data for the German viticultural regions where we found Grapevine Yellows.

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Baden	16SrXII-A; Stolbur	tuf A (tuf B)	Bois noir	Low, locally high	Grapevine Convolvulus arvensis Urtica dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP
Franken	16SrXII-A; Stolbur 16SrV; PGY; AldY	tuf A tuf B type A	Bois noir Palatinate Grapevine Yellows; Alder Yellows	Low Very low ?	Grapevine, C.arvensis, U. dioica Grapevine Alnus glutinosa	Grapevine Yellows Grapevine Yellows No clear symptoms	PCR-RFLP
Hessische Bergstraße	16SrXII-A; Stolbur	tuf A tuf B	Bois noir	Low	Grapevine, C.arvensis, U. dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP
Mittelrhein	16SrXII-A; Stolbur	tuf A tuf B	Bois noir	High to very high (20-80%)	Grapevine, C.arvensis, U. dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP
Mosel	16SrXII-A; Stolbur 16SrV; PGY; AldY	tuf A tuf B tuf C type A,B,C	Bois noir Palatinate GY Alder Yellows	High to very high (20-50%) Very low <1% Very high	Grapevine, C.arvensis, U. dioica Grapevine Alnus glutinosa	Grapevine Yellow Stunting, Yellowing No clear symptoms Grapevine Yellows No clear symptoms	PCR-RFLP

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Nahe	16SrXII-A; Stolbur	tuf A tuf B	Bois noir	Low, locally high (20-40%)	Grapevine, C.arvensis, U. dioica Potato	Grapevine Yellow Stunting, Yellowing No clear symptoms Typical symptoms of Potato stolbur	PCR-RFLP
Pfalz	16SrXII-A; Stolbur 16SrV; PGY; AldY	tuf A ((tuf B)) type A,B,C	Bois noir Palatinate GY Alder Yellows	Low, locally high Low <3% Very high	Grapevine, C.arvensis, U. dioica Grapevine Alnus glutinosa	Grapevine Yellow Stunting, Yellowing No clear symptoms Grapevine Yellows No clear symptoms	PCR-RFLP
Rheingau	16SrXII-A; Stolbur	tuf A tuf B	Bois noir	Low	Grapevine, C.arvensis, U. dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP
Rheinhessen	16SrXII-A; Stolbur	tuf A ((tuf B))	Bois noir	Low	Grapevine, C.arvensis, U. dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP
Württemberg	16SrXII-A; Stolbur	tuf A ((tuf B))	Bois noir	Low, locally very high	Grapevine, C.arvensis, U. dioica	Grapevine Yellow Stunting, Yellowing No clear symptoms	PCR-RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Hyalesthes obsoletus		Variable: density corresponds to Bois noir incidence (see table above)	Stolbur 16SrXII-A	Depending on host plants and region: <1% to 80%	PCR	Ranunculus repens/bulbosus Convolvulus arvensis Urtica dioica Artemisia vulgaris	Sticky traps, sweep net, leaf-blower	standard
Oncopsis alni		High on Alnus, extremely low in vineyards	16Sr-V Palatinate GY and Alder Yellows	Variable, around 5-15%	PCR	Alnus glutinosa	Sweep net, leaf blower	standard

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Presence of phytoplasma diseases detected in your country/region							
Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Country-wide	'Ca. P. solani'	*Tuf-type b*	Grapevine yellows Potato stolbur	distributed, continuously spreading	grapevine, tomato, potato, pepper, celery, carrot, eggplant, maize, stinging nettle, bindweed dandelion, tobacco, rape	general: yellowing/reddening, necrosis, leaf rolling; on grape: short internodes, incomplete lignification, infected bunches wither& die; on potato: purple top, aerial tubers	Triplex RT PCR based on map gene, nested PCR/RFLP on 16SrRNA
Country-wide	Alder yellows	Map-AldY Map-FD-3	Alder yellows	distributed, continuously spreading	alder, clematis	asymptomatic or yellowing/reddening, leaf rolling, stunting of plants,	Triplex RT PCR on map gene, nested PCR/RFLP on 16SrRNA
north-east HU central HU	'Ca. P pyri'	not typed	Pear decline	present sporadic	pear	Early discoloration of leaves: yellowing or reddening, leaf rolling, necrosis in the cambium, tree decline	nested PCR/RFLP on 16SrRNA
sporadic	'Ca. P mali'	not typed	Apple proliferation	present sporadic	apple, pear	proliferation, enlarged stipules, shoot tip rosette & dieback of shoot tips, early leaf discoloration, phyllody, small fruits with long peduncles, tree decline	nested PCR/RFLP on 16SrRNA
Country-wide	'Ca. P prunorum'	not typed	European stone fruit yellows	wide spread	apricot, peach, sour cherry, *Prunus mahaleb,* cherry, almond, Japanese plum,	chlorosis, leafrolling, phloem necrosis	nested PCR/RFLP on 16SrRNA
south-west HU	Clover yellow edge (16SrIII-B)	not typed	X-disease	sporadic	*Cirsium arvense, Convolvulus arvensis*	proliferation, chlorosis	nested PCR/RFLP on 16SrRNA
Country-wide	Aster Yellow	not typed	aster yellows	sporadic	cabbage, cauliflower, savoy	proliferation	PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
Hyalesthes obsoletus		low denisity	Stolbur	18%	morphological	grapevine, vegetables	sweep netted	nested PCR/RFLP on 16SrRNA
	Reptalus panzeri	low denisity	Stolbur	9.2%	morphological	grapevine, vegetables	sweep netted	nested PCR/RFLP on 16SrRNA
Cacopsylla pyri			'Ca. P pyri'		morphological	pear	sweep netted	nested PCR/RFLP on 16SrRNA
Cacopsylla pyricola			'Ca. P pyri'		morphological	pear	sweep netted	nested PCR/RFLP on 16SrRNA
Cacopsylla pruni		no data no data	no data no data	no data no data	morphological morphological	apricot blackthorn	sweep netted sweep netted	
Cacopsylla melanoneura		no data	no data	no data	morphological	apple	sweep netted	
Scaphoideus titanus		high density	not found	0%	morphological	grapevine	sweep netted	nested PCR/RFLP on 16SrRNA
Oncopsis alni		low density	Alder yellows	15%	morphological	alder	sweep netted	Triplex RT PCR on map gene, nested PCR/RFLP on 16SrRNA
	Dictyophara europea	low density	Alder yellows	0%	morphological	meadow	sweep netted	Triplex RT PCR on map gene, nested PCR/RFLP on 16SrRNA

Publications:

Z. Ács, N. Contaldo, I. Ember, S. Paltrinieri, M. Kolber, B. Duduk, and A. Bertaccini, 2011. 'Bois noir' in Hungary: tuf-type b strain, variability on 16Sribosmal gene. *Book of Abstracts*. 2nd European Bois Noir Workshop, Castelbrando, Italy, February 27th –March 1st, 2011. p.71-72.

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WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Khorassan	16SrXII-A		stolbur phytoplasmas		Grapevine	In the spring, sympotmatic plants are delayed in growth, and later in season, the plants show dwarfed canes and shrunked or dried small fruits. Infected plants may die within months or years; drought conditions and hot temperatures speed up symptom development	Direct PCR amplification first nested PCR assay with primers F1/B6 RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s

Publications:

1- **Mahmoudreza Mahmoudreza KARIMI[1], Nicoletta CONTALDO[2], Bagher MAHMOUDI[3], Bojan DUDUK[2,4], Assunta BERTACCINI[2*] . 2009. IDENTIFICATION OF STOLBUR-RELATED PHYTOPLASMAS IN GRAPEVINE SHOWING DECLINE SYMPTOMS IN IRAN .16th Meeting of the international Council for the Study of Virus and Viruslike Diseases of grapevine.Dijon.France**

2- **M.R. Karimi[1], N. Contaldo[2], M. Hagian[1], M. Vojdanifar[3], A. Taymori[3], R. Aliakbari[4], A. Bertaccini[2] .2010.Phytoplasma detection in pistachio in Iran. Current status and perspectives of phytoplasma disease research and management.February 1st and Sitges, Spain**

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Galil & Golan	Stolbur type		Grapevine yellows	1-70%	grapevines	**Leaf curl, colour, non lignified shoots, berry shriveling**	**Visual +PCR**

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
Hyalesthes obseletus		Very low on vines			Yellow traps	*Vitex agnus castus*	vacuming	visual

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Working Group 2: Epidemiology and Vector Ecology **Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE**

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Marche, Central Eastern Italy	Stolbur	Tuf type I, II	Bois noir	2-30%	grapevine	Leaf yellowing/reddening, cluster early drying	PCR
Abruzzi, Central Eastern Italy	Stolbur	Tuf type I, II	Bois noir	2-30%	grapevine	Leaf yellowing/reddening, cluster early drying	PCR
Apulia, SouthEastern Italy	Stolbur	Tuf type I, II	Bois noir	0-5%	grapevine	Leaf yellowing/reddening, early cluster drying	PCR
Marche, Central Eastern Italy	Stolbur	Tuf type I, II	Stolbur	0-60%	*Convolvulus arvensis*	Leaf yellowing	PCR
Abruzzi, Central Eastern Italy	Stolbur	Tuf type I, II	Stolbur	0-60%	*Convolvulus arvensis, Tussilago farfara*	Leaf yellowing (C.a.), leaf reddening (T.f.)	PCR
Marche, Central Eastern Italy	Flavescence dorée	C	Flavescence dorée	0-1%	grapevine	Leaf yellowing/reddening, cluster early drying	PCR
Marche, Central Eastern Italy	Candidatus Phytoplasma asteris		GY	0-1%	grapevine	Leaf yellowing/reddening, cluster early drying	PCR
Marche, Central Eastern Italy	Candidatus Phytoplasma pruni		X Disease	0-1%	grapevine	Leaf yellowing/reddening, cluster early drying	PCR
Marche, Central Eastern Italy	Candidatus Phytoplasma pruni		X Disease	0-1%	Peach	Leaf reddening, rolling and deformation	PCR
Marche, Central Eastern Italy	Candidatus Phytoplasma prunorum		ESFY	0-50%	Peach, Japanese plum	Leaf reddening, rolling and deformation	PCR
Marche, Central Eastern Italy	Candidatus Phytoplasma ulmi		Elm yellows	0-50%	*Zelkova serrata*	Leaf reddening, rolling and deformation	PCR

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
South Tyrol (Provincia di Bolzano)	Ca. Phytoplasma mali	AT-2	Apple proliferation	~0-5% (dependent on area)	Apple	Whitches broom, reddening, enlarged stipulae,…	PCR
	Ca. Phytoplasma stolani	VK type I, VK type II	Bois noir	~0-25% (dependent on cultivar)	Grapevine	Leaf symptoms	PCR
	Ca. Phytoplasma prunorum		European Stone fruit Yellow	important only in abandoned orchards	apricot	Leaf symptoms	PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla picta		Low	+	10%	PCR			morphology
C. melanoneura		Low	+	<1%	PCR			
Hyalesthes obsoletus		low	+	~10-50%	PCR		Net sweeping	morphology

Publications

Kunz G., Roschatt C., Schweigkofler W. (submitted). *Biodiversity of planthoppers (Auchenorrhyncha) in vineyards infected by the Bois noir phytoplasma.*

Berger J., Schweigkofler W., Kerschbamer C., Roschatt C., Dalla Via J, Baric S. (2009). *Occurrence of Stolbur phytoplasma in the vector Hyalesthes obsoletus, herbaceous host plants and grapevine in South Tyrol (Northern Italy).* Vitis 48, 185-192.

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Lombardy	*Ca.* P. mali	AT-1	Apple proliferation	10 to 70 %	apples	Witches-broom unusually long stipules smaller fruits	Nested PCR (F1(X)/R1(X))
Lombardy Veneto	Stolbur	Tuf-I Tuf-II	Bois noir	10 to 50%	Grapevine, nettles, bindweeds	Leafroll, yellowing and reddering, no production	Real time PCR
Lombardy Veneto	Flavescence doree	FD-C FD-D	Flavescence dorée	5 to 30 %	grapevine	Leafroll, yellowing and reddering, no production	Real time PCR
Piedmont	Flavescence dorée	FD-C FD-D	Flavescence dorée	1-50% of the plants within the same vineyard	Grapevine	Leaf yellowing or redness, leaf curling, canes remaining green (no lignification)	Nested PCR (F1(V)/R1(V)) M1/B6 + RFLP

	Stolbur	Tuf-A Tuf-B	Bois noir	< 1% oft he plants within the same vineyard	Grapevine	Same as FD	Nested PCR (F1(I)/R1(I)) r tuf/f tuf + RFLP stol1H10 F2/R2 + RFLP
Valle d'Aosta	Flavescence dorée	FD-C FD-D	Flavescence doree	Less than 1 plant per vineyard	Grapevine	Leaf yellowing or redness, leaf curling, canes remaining green (no lignification)	Real Time PCR (FAY/REY) Nested PCR (P1/P7 + F1/V1731) + RFLP (F1(V)/R1(V)) M1/B6 + RFLP
	Stolbur	Tuf-A Tuf-B	Bois noir	0 - 50% oft he plants within the same vineyard	Grapevine	Same as FD	Nested PCR (F1(I)/R1(I)) r tuf/f tuf + RFLP stol1H10 F2/R2 + RFLP
Piedmont Valle d'Aosta	*Ca.* P. mali	AT-1 AP-15 AT-2	Apple proliferation	5 to 70%	Apples Hawthorn	Witches-broom unusually long stipules smaller fruits	Nested PCR (F1(X)/R1(X)) (fO1/rO1) + RFLP
Piedmont Valle d'Aosta	*Ca.* P. pyri		Pear Decline	10 to 70%	pear	Leaf reddening, smaller fruits	Nested PCR (fO1/rO1) + RFLP
Piedmont	*Ca.* P. prunorum		European Stone Fruit Yellows	5 to 30% (plum) 2-4 % (apricot)	Plum, apricot	Chlorotic leaf roll, early foliation	Nested PCR (fO1/rO1) + RFLP
Piedmont Liguria	*Ca.* P. asteris	16SrXI-B	Chrysantemum yellow		*Chrysantemum* spp., *Argyranthemum frutescens*, *Tagetes* spp., etc…	Leaf yellowing and chlorosys, witches-broom, phyllody	Nested PCR F1/R1(I) + RFLP

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Scaphoideus titanus		Up to 500 adults per season collected in sticky panels if no insecticides are applied, or on wild grapevine; very rare in treated vineyards	16SrV-C, D	1-20% on European grapevine (depending on rate of infected plants within vineyard); up to 50 % on American grapevine	Real Time PCR (FAY/REY) Nested PCR (P1/P7 + F1/V1731) + RFLP	Wild (American) and cultivated (European) grapevine	Sticky panels, sweep net (adults); frappage or direct collection on leaves (larvae)	Morphological features (*Scaphoideus* species are identified via the male genitalia, but to date only *S. titanus* is recorded in Europe)
	Dictyophara europaea	10-20 adults collected with sweep net per site; 4-10% of individuals are parasitized by dryinidae	16SrV	0-2%	Real Time PCR (FAY/REY) Nested PCR (P1/P7 + F1/V1731) + RFLP	Weeds (*Amaranthus retroflexus, Urtica dioica, Clematis vitalba,* and other); bushes, including grapevine (adults)	Sweep net (larvae and adults)	Morphological features (this family include few species in Europe, that are very easy to identify)
Hyalesthes obsoletus		Up to 100-200 adults in patches, especially on stinging nettle; fewer specimens occur on bindweed	16SrXII	10-40% on stinging nettle (data 2007)	Real Time PCR (Stol fw/Stol rev) Nested PCR (P1/P7 + F1/R1(I)) + RFLP r tuf/f tuf + RFLP	*Convolvulus arvensis Urtica dioica Ambrosia Artemisia*	Stinging nettle, bindweed; grapevine (adults only)	Morphology + molecular tools
	Hyalesthes luteipes		16SrXII	1 - 7%	Real Time PCR (Stol	*Ulmus minor*	Sweep net (adults)	Morphology + molecular tools

					fw/Stol rev) Nested PCR (P1/P7 + F1/R1(I)) + RFLP r tuf/f tuf + RFLP			
	Reptalus quinquecostatus		16SrXII	0 – 40%	Real Time PCR (Stol fw/Stol rev) Nested PCR (P1/P7 + F1/R1(I)) + RFLP r tuf/f tuf + RFLP	Trees and bushes (*Ulmus campestris, Malus* sp., *Salix alba*); weeds (*Sinapis* spp; *Convolvulus arvensis*: *Rubus* spp)	Sweep net (adults)	Morphology + molecular tools
Cacopsylla melanoneura		High	*Ca.* P. mali	Overwintered adults: 3-4% Offspring adults: 0.8%	Nested PCR(fO1/rO1) + RFLP	Apple Hawthorn Conifers	Sticky traps, sweep net (on conifers), beat-tray	Morphology + PCR (MEL fw/MEL rev)
Cacopsylla pyri		High	*Ca.* P.pyri	20 to 70%	Nested PCR(fO1/rO1) + RFLP	Pear	Sticky traps, beat-tray	Morphology
Cacopsylla pyricola		Medium	*Ca.* P. pyri		Nested PCR(fO1/rO1) + RFLP	Pear	Sticky traps, beat-tray	Morphology
Cacopsylla pruni		Very low	*Ca.* P. prunorum		Nested PCR(fO1/rO1) + RFLP	Apricot Plum *Prunus spinosa* Conifers	Sticky traps, beat-tray, sweep net (on conifers)	Morphology
Fieberiella florii		Low	*Ca.* P. mali	Up to 20%	Nested PCR(fO1/rO1) + RFLP	Rosaceous (wild and cultivated)	Sticky traps, beat-tray	Morphology
	Cacopsylla affinis	Medium-low	*Ca.* P. prunorum Ca. P. pyri	0.5%	Nested PCR(fO1/rO1) + RFLP	Hawthorn Conifers	Sticky traps, beat-tray	Morphology + PCR (AFF fw/AFF rev)

	Cacopsylla crataegi	Low	*Ca.* P. pyri		Nested PCR(fO1/rO1) + RFLP	Hawthorn	Sticky traps, beat-tray	Morphology
	Cacopsylla peregrina	High	*Ca.* P. mali *Ca.* P. pyri *Ca.* P. prunorum	34.3% 57% 8.6%	Nested PCR(fO1/rO1) + RFLP	Hawthorn	Sticky traps, beat-tray	Morphology
Euscelidius variegatus		mean number of adults per trap: 2.7 ± 0.6	16SrI-B 16SrV		Nested PCR F1/R1(I) + RFLP Real Time PCR (FAY/REY) Nested PCR(P1/P7 + F1/V1731 + RFLP	marguerite, chrysanthemum, lettuce, gladiolus, cyclamen	Sweep net, Sticky traps	Morphological features
Euscelis incisus			16SrI-B		Nested PCR F1/R1(I) + RFLP	marguerite, chrysanthemum	Sweep net, Sticky traps	Morphological features
Macrosteles quadripunctulatus			16SrI-B		Nested PCR F1/R1(I) + RFLP	marguerite, chrysanthemum	Sweep net, Sticky traps	Morphological features
	Macrosteles sexnotatus	mean number of adults per trap: 18.7 ± 3.5	16SrI-B		Nested PCR F1/R1(I) + RFLP	gladiolus	Sweep net, Sticky traps	Morphological features

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I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Bekaa Valley, North Lebanon, Mount Lebanon, South Lebanon	'*Candidatus* Phytoplasma phoenicium	16SrIX subgroups, B, D, F and G	Almond Witches' broom	High	Peach, almond	Yellowing, shoot proliferation, witches' broom, small leaves, rapid tree death	PCR, sequencing of amplified DNA
Bekaa Valley	'*Candidatus* Phytoplasma pyri	16SrX-C Lebanese *Ca.* P.pyri strain is genetically different from the Europen strains	Pear decline	Low to medium	Pear	Premature reddening and upward rolling of leaves which often had also down-turned petioles	PCR, sequencing of amplified DNA
Bekaa Valley, Mount Lebanon	Solbur	16SrXII-A	Bois noir	Medium to high	Grapevine	Yellowing or reddening depending on the cultivars, leaf rolling, incomplete wood ripening	PCR, sequencing of amplified DNA
Bekaa Valley		16SrII	Cactus shoot proliferation	Low	Cactus (*Opuntia monocantha*)	Stem and shoot proliferation	PCR, sequencing of amplified DNA
Bekaa Valley, Mount Lebanon, North Lebanon	'*Candidatus* Phytoplasma trifolii	16SrVI-Phytoplasma Tomato Lebanon		Low to medium	Tomato, pepper	Tomato plants with stunting, yellowing or purplish leaves, proliferation of laterals buds, hypertrophic calyxes and virescent flowers Pepper plants with stunting and yellowing of leaves	PCR, sequencing of amplified DNA

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
	Euscelis incisus Kirschbaum		*Ca.* P. asteris' (group 16SrI)		PCR, sequencing of amplified DNA			
	Psammotettix provincialis Ribaut		*Ca.* P. asteris' (group 16SrI)		PCR, sequencing of amplified DNA			
	Selenocephalus tapan Dlabola		Vigna little leaf phytoplasma of group 16SrIX		PCR, sequencing of amplified DNA			
	Cacopsylla myrthi Puton		*Ca.* P. rhamni'		PCR, sequencing of amplified DNA			
	Anaceratagallia laevis Ribaut		'*Ca.* P. trifolii'		PCR, sequencing of amplified DNA			
	Balclutha sp. Kirkaldy		'*Ca.* P. trifolii'		PCR, sequencing of amplified DNA			
	Circulifer sp. Zachvatkin and *Neoaliturus fenestratus* Herrich-Schäffer		*Lactuca serriola* phytoplasma (group 16SrIX)		PCR, sequencing of amplified DNA			

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Norway	Apple proliferation	Unknown	Apple proliferation	Present in all fruit growing districts	Apple	**Proliferation, small fruits, enlarged stipules**	**PCR**

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
	C. picta	Not found	AP-vector?	Not known			Colour trap sweep net	Morphological
	C. melanoneura	Present	AP-vector?	Not known			Colour trap sweep net	Morphological
	C. affinis	Present	AP-vector?	Not known			Colour trap sweep net	Morphological
	C. crataegi	Not found	AP-vector?	Not known			Colour trap sweep net	Morphological
	C. pruni	High					Colour trap sweep net	Morphological
	C. pyri	High					Colour trap sweep net	Morphological
	C. pyricola	Low					Colour trap sweep net	Morphological
	C. pyrisuga	High					Colour trap sweep net	Morphological
	C. bidens	Not present					Colour trap sweep net	Morphological
	C. notata	Not present					Colour trap sweep net	Morphological
	C. peregrina,	High					Colour trap sweep net	Morphological
	C. crataegi	Not found					Colour trap sweep net	Morphological

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Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Different regions	'*Candidatus* Phytoplasma mali'	AP15, AT1, PI, PII	Apple proliferation	quite often? incidentally	apple nectarine	Proliferation, small fruits yellowing	PCR/RFLP, sequencing
Different regions	'*Candidatus* Phytoplasma pyri'		Pear decline	often incidentally	Pear sweet cherry	reddening, declining yellowing	PCR/RFLP, sequencing
Different regions	'*Candidatus* Phytoplasma prunorum'		European stone fruit yellows	incidentally		Chlorotic leaf roll, premature reddening of the leaves, shortening of the shoots, late blooming, fruit anomalies, necrosis of the trunk and branches as well as die-back and decline	PCR/RFLP, sequencing
Different regions	'*Candidatus* Phytoplasma ulmi'		Rubus stunt	incidentally	Rubus sp. (raspberry, blackberry, loganberry, tayberry, *R. fructicosus*)	Stunting, yellowing, premature reddening, epinasty of the leaves, shortening and proliferation of shoots, phyllody, virescence of flowers and abnormal fruits	PCR/RFLP, sequencing
Different regions	'*Candidatus* Phytoplasma asteris'	Subgroup 16SrI-A, B, R	Aster yellows	incidentally	strawberry	sterile flowers with green or pinkish petals and enlarged sepals, small, hard, deformed fruits, phylloid receptacles	PCR/RFLP, sequencing
South-eastern part	'*Candidatus* Phytoplasma asteris'	Subgroup 16SrI-B	Aster yellows	incidentally	hazel	Stunting, rolled and chlorotic leaves	PCR/RFLP, sequencing
Central Poland	'*Candidatus* Phytoplasma asteris'	Subgroup 16SrI-B	Aster yellows	incidentally	*Rubus fructicosus*,	Stunting, yellowing, no fruits	PCR/RFLP, sequencing

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla picta		quite often	'*Candidatus* Phytoplasma mali'		PCR	apple	Yellow sticky traps, beat tray	RFLP
Cacopsylla melanoneura		quite often	'*Candidatus* Phytoplasma mali'		PCR	apple	Yellow sticky traps beat tray,	RFLP
	Cacopsylla pyritsuga	often	'*Candidatus* Phytoplasma pyri'			pear	beat tray	
	Cacopsylla pyricola	incidentally	'*Candidatus* Phytoplasma pyri'			pear	beat tray	
Cacopsylla pyri		commonly	'*Candidatus* Phytoplasma pyri'		PCR	pear	beat tray	RFLP
Cacopsylla pruni		quite often?	'*Candidatus* Phytoplasma prunorum'		PCR	Japanese plum, apricot, plum	beat tray	RFLP

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WG 2/Task 2 QUESTIONNAIRE

I

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Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Northeast and Central regions of PORTUGAL	Flavescence dorée	FD-D	Flavescence dorée	low	grapevine	Early yellowing (or reddening) and rolling of leaves. Desiccation of inflorescences, withering of clusters, irregular maturation of the wood	Nested –PCR and RFLP
	Bois noir	BN					

Phytoplasma vectors (putative/acknowledged) identified in your country/region	

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Scaphoideus titanus		high	FD-D	Very low	Nested-PCR and RFLP in vectors		Yellow traps, nets	Insect morphology
Cacopsylla pyri			Ca. Phytoplasma Pyri (PD)					

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
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Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Romania	PD		Pear decline		Pear	Redding of leaves,	Dot Blot Immunoassay Method Experimental transmission to *Catharantus roseus* by psyllids
Romania	AP		Apple proliferation		Apple	Enlarge stipules, witches' broom	Electron microscopy
Romania	ESFY		Apricot decline		Apricot	Apoplexy, chlorotic leaf roll, short shoots, phloem necrosis	Experimental transmission to *Catharantus roseus* by dodder bridge, Electron microscopy
Romania	BN		BN		Grapevine	Grapevine with yellowing and reddening symptoms, triangle aspect of leaves	Experimental transmission to *Catharantus roseus* by insects Electron microscopy serology
Romania	Aster yellows		Aster yellows		Grapevine	Grapevine with yellowing and reddening symptoms, triangle aspect of leaves	Electron microscopy, serology

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Romania	FD		Flavescence dorée		Grapevine	symptoms of yellowing	visual observations Elisa test
Phytoplasma vectors (putative/acknowledged) identified in your country/region							

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Hyalesthes obsoletus		Moderate-low	BN		Experimental transmission to *Catharantus roseus* by insects	*Convolvulus arvensis*	Sweep net	Morphological characters
	Scaphoideus titanus *Reptalus panzeri* *Fieberiella florii* *Neoaliturus fenestratus* *Dictyophara europaea*	Low Low Moderate Low Low				Grapevine	Yellow sticky traps	Morphological characters
Cacopsylla pyri		high	PD		Dot Blot Immunoassay Method	pear	Beating of shoots, Yellow sticky traps,	Morphological characters
	C. pyrisuga	moderate				pear, apple	Beating of shoots, Yellow sticky traps,	Morphological characters
	C. melanoneura	High on *Crataegus* Moderate to low on apple				hawthorn, pear, apple	Beating of shoots, Yellow sticky traps,	Morphological characters
	Metcalfa pruinosa	low				Grapevine, hawthorn, pear, apple, another species	Yellow sticky traps, visual control	Morphological characters

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla picta	*C. melanoneura C. affinis, C. pyri, C. crataegi*		AP					

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems

Working Group 2: Epidemiology and Vector Ecology

Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s

Region/s	Phytoplasma/s	Host		No. of samples infected		Symptoms	Detection method/s
		Latin	English				
West Siberia	CX (16SrIII)	*Solanum tuberosum*	potato	1		Curl top	Nested PCR, RFLP
West Siberia	Stolbur (16 SrXII)	*S. tuberosum*	potato	1		Purple top	The same
Archangelsk province (North Region of Russia)	Stolbur (16 SrXII)	*S. tuberosum*	potato	1		Reddening and rolling of leaflets	The same
Archangelsk province (North Region of Russia)	Aster yellow (16SrI)	*S. tuberosum*	potato	1		Reddening and rolling of leaflets	The same

Russia, Central Region,	Stolbur (16 SrXII)	*S. tuberosum*	potato	2		Reddening and rolling of leaflets	The same
Russia, Central Region,	CX (16SrIII)	*Taraxacum officinale* Wigg.	Dandelion	2		Phyllody. Proliferation, yellowish leaf-lets.	The same
Russia, Central Region,	CX (16SrIII)	*Trifolium pratenze* L.	Red clover	5		Mosaic. Stunt. Reddish and small leaflets	The same
Russia, Central Region,	CX (16SrIII)	*Lupinus L.*	Lupine	1		Purple edges of leaflets	The same
Russia, Central Region,	CX (16SrIII)	*Aegopodium* L.	Goutweed	1		Stunt	The same
Russia, Central Region,	CX (16SrIII)	*Sonchus arvensis* L.	Sow thistle	1		Rolling of leaflets	The same
Russia, Central Region,	CX (16SrIII)	*T. hybridum* L.	Clover	3		Purple edges of leaflets. Phyllody. Reddish and small leaflets	The same
Russia, Central Region,	CX (16SrIII)	*Lathyrus L.*	Wetchling	1		Rolling of leaflets	The same
Russia, Central Region,	CX (16SrIII)	*Sonchus arvensis* L.	Sow thistle	1		Small buds, greening	The same
Russia, Central Region,	CX (16SrIII)	*Taraxacum officinale* Wigg.	Dandelion	1		The same	The same
Russia, Central Region,	Stolbur (16SrXII)	*Lycopersicon esculentum* L.	Tomato	6		Purple edges of leaflets. Rolling of leaf-lets, sprouts.	The same
Russia, Central Region,	Stolbur (16SrXII)	*Cosmea*	Cosmeja	1		Stunt	The same
Russia, Central Region,	CP (16SrVI)	*Medicago* L.	Alfalfa	1		Stunt, witch's-broom, yellowish leaflets,	The same
Russia, Central Region,	CP (16SrVI)	*Brassica napus* var. oliefere DC	Colza	2		Inflorescence "spatulas"	The same
Russia, Central Region,	CP (16SrVI)	*Rubus idaeus L.*	Raspberry	1		Proliferation	The same
Russia, Central Region,	Aster yellow (16SrI)	*S. tuberosum*	potato	18		Reddening of veins of leaf-lets, Ivy-like leaves	The same
Russia, Central Region,	Aster yellow (16SrI)	*T. pratenze* L.	Red clover	1		Stunt, small leaflets	The same

Russia, Central Region,	Aster yellow (16SrI)	*L. esculentum* L.	Tomato	1		Proliferation, buds	The same
Russia, Central Region,	Aster yellow (16SrI)	*Esholtzia Cam.*	California poppy	1		Red leaf-lets, chlorosis	The same

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s

Vectors (aknowledged)	Vectors (putative)	Vector host\s	Phytoplasma/s	No. of insects positive/examined	Detection method/s		Collection method/s	Identification method/s
Macrosteles laevis Rib		*Solanum tuberosum*	16SrIII – X-disease group	5/16	Nested PCR		mowing with entomological net	RFLP
Aphrodes bicinctus Schrk.		*Trifolium hybridum*	16SrI – Aster yellow group	3/4	The same		The same	The same
Cicadula quadrinotata F.		*Lotus corniculatus*	Mixture	1/4	The same		The same	The same
Empoasca pteridis Dhlb.		*L. corniculatus*	16SrI – Aster yellow group	1/3	The same		The same	The same
Euscelis plebejus Fall.		*T. hybridum*	16SrI – Aster yellow group	8/11	The same		The same	The same
		T. pratense		7/18	The same		The same	The same
		Medicago sativa		1/1	The same		The same	The same
		L. corniculatus		2/2	The same		The same	The same
Philaenus spumarius L.		*L. corniculatus*	16SrI – Aster yellow group	1/6	The same		The same	The same
Sonronius binotatus J.Shlb.		*T. hybridum*	16SrI – Aster yellow group	1/28	The same		The same	The same

Publications: Unpublished

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WG 2/Task 2 QUESTIONNAIRE

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Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
	AP				Apple		**PCR,RFLP, sequencing**
	ESFY				Peach, apricot, eur. plum		**PCR,RFLP, sequencing**
	PD				Pear		**PCR,RFLP, sequencing**
	FD				Grapevine		**PCR,RFLP, sequencing**
	BN				Grapevine, other hosts for stolbur		**PCR,RFLP, sequencing**

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
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Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address		
Name	**Institution country/region**	**email / telephone**
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Presence of phytoplasma diseases detected in your country/region									
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**		
Serbia	**16SrI**	16SrI-A, 16SrI-B, 16SrI-C 16SrI-P	carrot yellows aster yellows	3%	**carrot** (Duduk *et al.*, 2007) ***Populus nigra*** (Mitrovic and Duduk, 2009)	common common	PCR, RFLP		
	16SrIII	16SrIII-B			***Cirsium arvense*** **(**Rančić *et al.*, 2005)	common	PCR, RFLP		
	Elm yellows (16SrV)	16SrV-C	Flavescence doree	10-100%	***Vitis vinifera*** (Duduk *et al.*, 2003b) (Krnjajić, 2009; Krnjajić *et al.*, 2007) ***Clematis vitalba*** (Krnjajić, 2009)	common common common	PCR, RFLP PCR, RFLP PCR, RFLP		
	Apple proliferation (16SrX)		Apple proliferation		**apple** Šutić (1995) **pear**	common common	Visual inspection		

		’*Ca.* Phytoplasma mali’ (16SrX-A) ’*Ca.* Phytoplasma prunorum’ (16SrX-B) ‚*Candidatus* Phytoplasma piry’ (16SrX-C)			(Vojvodić and Grbić, 1969) **apple** ((Duduk *et al.*, 2005b) **plum, apricot** (Tanasković and Carraro, 2003), **peach** (Duduk *et al.*, 2005b) **pear** (Duduk *et al.*, 2005a)	common common common common	Visual inspection PCR, RFLP PCR, RFLP PCR, RFLP		
	Stolbur (16SrXII)	‚*Candidatus*	Corn reddening	85%	**Solanacea** (Martinović and Bjegović, 1950) **Solanacea, Convolvulus arvensis** (Aleksić *et al.*, 1967;1969; Šutić, 1995) ***Sonchus oleraceus, C.***	common common common	Visual inspection Visual inspection, transmittion PCR, RFLP		

		Phytoplasma solani' (16SrXII-A)	Bois noir		***arvensis* (Duduk, 2006b)** **corn,** (Duduk and Bertaccini, 2006) ***Triticum aestivum, Sorghum halepense*** (Jovic *et al*., 2009) **peach** (Duduk *et al.*, 2005b) **grapevine** (Duduk et al., 2004a) **chrysanthemum** (Duduk *et al.*, 2005b, 2006a)	common common common common common	PCR, RFLP PCR, RFLP PCR, RFLP PCR, RFLP PCR, RFLP		

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s of phytoplasmas/s
Scaphoideus titanus (Krnjajić, 2009)		high (>100 collected specimens)	16SrV-C	50%	Visual inspection	*Vitis vinifera*, *Vitis* spp.	aspirator, sweep-netting yellow sticky traps	PCR, RFLP
Reptalus panzeri (Jović *et al.*, 2009)		high (>100 collected specimens)	16SrXII-A	17%	-//-	Maize, *Sorghum halepense*, *Triticum aestivum*	-//-	PCR, RFLP
R. quinquecostatus (Jović *et al.*, 2009)		high (>100 collected specimens)	16SrXII-A	18, 52%	-//-	maize	-//-	-//-
Macrosteles laevis (Duduk *et al.*, 2008)		low (<25 collected specimens	16SrXII-A	33, 33%	-//-	Carrot, weeds near by	-//-	-//-
M. quadripunctulatus (Duduk *et al.*, 2008)		low (<25 collected specimens	16SrI-A (1); 16SrI-B (1)	100%	-//-	-//-	-//-	-//-
M. sexnotatus (Duduk *et al.*, 2008)		high	16SrI-A (1); 16SrI-B (2)	50%	-//-	-//-	-//-	-//-
***Anaceratagallia ribauti* (Drobnjaković *et al.*, 2009)**		low (<25 collected specimens	16SrXII-A(2)	50%	-//-	-//-	-//-	-//-

Additional note:

The most relevant vector of stolbur in Serbia was determined as *Hyalesthes obsoletus* (Aleksić *et al.*, 1967;1969; Šutić, 1995). *R. panzeri* is established as a new vector of phytoplasmas (Jović eta al., 2009), (during the transmission experiments), the other mentioned acknowledged vector species are known vectors of phytoplasmas throughout the world.

In Serbia, *Cacopsylla melanoneura* (Jerinić-Prodanović , 2006), *C. picta* (Jerinić-Prodanović , 2007), *Bactericera tremblayi* (Jerinić-Prodanović , 2003, 2006) and *Metcalfa prunosa* (Mihajlović, 2007) (aknowledged vectors of phytoplasmas) are also recorded in Serbia, but were not tested for phytoplasma/s. Also, leafhopper *Euscelis incisus* is recorded in Serbia, but showed no presence of phytoplasma/s (Jović et al., 2009; Krnjajić, 2009).

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

Your address

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Serbia, Banat region (Jović *et al.*, 2009 and references therein)	16SrXII-A '*Ca.* P. solani'	-	*Maize Redness* (Duduk and Bertaccini, 2006; Jović *et al.*, 2007a; 2009)	From 10 up to 90% of plants expressing symptoms (Jović *et al.*, 2009 and references therein)	Maize (*Zea mays*), johnsongrass *(Sorghum halepense),* wheat (*Triticum aestivum)* (Jović *et al.*, 2009)	Midrib reddening is the first symptom to appear, followed by reddening of leaves and stalks and then whole-plant desiccation. Maize redness (MR) is also associated with abnormal ear development and reduced seed numbers, leading to significant yield reduction. (Jović *et al.*, 2009 and references therein)	Nested PCR with Stolbur phytoplasma specific primers Stol11f2r and Stol11f3r2 (Clair *et al.*, 2003) falowing protocol by Radonjić *et al.*, 2009.
Serbia. North, east and central Serbia (all grape growing regions). Kuzmanović *et al*.,2008; Cvrković, 2009	16SrXII-A '*Ca.* P. solani'	tufAY-b	*Bois Noir* (Duduk *et al*. 2004, Kuzmanović *et al*., 2008; Cvrković, 2009)	From 10 up to 70% of plants expressing symptoms (Cvrković, 2009)	*Vitis sp.*	Discoloration and rolling of leaves.	Stol11f2r and Stol11f3r2 (Clair *et al.*, 2003). Tuf strain detection with fTuf1/rTuf1 and fTufAY/rTufAY primer pair (Schneider et al., 1997) RFLP analyzes with HpaII enzyme according to Langer and Maixner, 2004.
Northwest, central and southeast Serbia (Krnjajić et al, 2007)	16SrV-C	FD-C	*Flavescence dorée* (Duduk *et al*. 2004, Krnjajić et al., 2007; Kuzmanović *et al*., 2008)	In all FD infected vineyards there are at least 30% of szmptomatic plants up to 100%	*Vitis sp.* (Duduk *et al*. 2004), *Clematis vitalba* (Angelini *et al.*, 2004, Filippin et al., 2009)	Discoloration, rolling of leaves, bad lignification of yang shuts, progressive decline of the plants and consequently infected grapevines die within a few years.	FD9f2r and FD9 f3r2 primers, fallowed with TaqI digestion (Agelini *et al.*, 2004)
Central and east Serbia (Cvrković *et al.*, 2008)	16SrV-C	-	*Alder yellows* (Cvrković *et al.*, 2008)	10-30% of symptomatic plants	*Alnus glutionsa*	Discrete leaf yellowing and multiple shoot growth from the basal part of trunk	rp(V)F1/rpR1 followed by rp(V)F1A/rp(V)R1A, followed by digestion with *Mse*I (Lee *et al*., 2004)
Northeast Serbia (Jović *et al.*, 2008)	16SrV-A '*Ca.* P. ulmi'	New strain	*Elm yellows* (Jović *et al.*, 2008)	30-40% of symptomatic plants	*Ulmus minor*, *Ulmus laevis*	Discrete leaf yellowing	PCR with rp(V)F1/rpR1 followed by

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Reptalus panzeri (Jović *et al.*, 2007a; 2007b; 2009)		Extremely high population density. In heavily effected fields during the population maximum (beginning of July) there are 30-50 individuals per maize plant	16SrXII-A '*Ca.* P. solani' *Maize Redness* disease	12-20%	Nested PCR with Stolbur phytoplasma specific primers Stol11f2r and Stol11f3r2 (Clair *et al.*, 2003) falowing protocol by Radonjić *et al.*, 2009.	Maize (*Zea mays*) is a main host plant! It is preferable host plant for adults and first instars larvae (L1-L3). In spring larvae (L4-L5) are found feeding mostly on roots of wheat (*Triticum aestivum*) plants (which are planted on last year corn field) and Johnsongrass (*Sorghum halepense*).	Insects are collected by mouth aspirator directly from maize plants or by sweeping the plants with a sweep net and then collect specimens with a mouth aspirator	Specimens are kept in vials containing 96% ethanol and subsequently identified to the species level using taxonomic keys based on morphology of male genital structure provided by Holzinger *et al*. (2003) and Biedermann and Niedringhaus (2004).
Hyalesthes obsoletus (Cvrković *et al.*, 2009)		Medium to high population density	16SrXII-A '*Ca.* P. solani' *Bois Noir* disease	18-40%	Stol11f2r and Stol11f3r2 (Clair *et al.*, 2003)	*Vitis sp.*,	Collection is made by sweeping the plants with a sweep net and then collect specimens with a mouth aspirator	The same as previous method
Scaphoideus titanus (Magud and Toševski, 2004, Krnjajić *et al.*, 2007)		Medium to high population density	16SrV-C *Flavescence dorée* FD disease	15-40%	FD9f2r and FD9 f3r2 (Agelini *et al.*, 2004)	*Vitis sp.*	The same as previous method	The same as previous method
Dictyophara europaea (Filippin *et al.*, 2009)		Medium population density	16SrV-C *Flavescence dorée* FD disease	3%	FD9f2r and FD9 f3r2 and RFLP with TaqI (Agelini *et al.*, 2004)	*Clematis vitalba, Vitis sp.*	The same as previous method	The same as previous method
	Dictyophara europaea (Cvrković, 2009; Cvrković *et al.*, 2010)	Medium population density	16SrXII-A '*Ca.* P. solani' *Bois Noir* disease	12%	Stol11f2r and Stol11f3r2 (Clair *et al.*, 2003)	*Vitis sp.*, *Clematis sp.*,	The same as previous method	The same as previous method
	Hyalesthes luteipes (Jović *et al.*, 2010)	Medium population density	16SrV-A '*Ca.* P. ulmi' *Elm yellows* disease	10%	FD9f2r and FD9 f3r2 (Agelini *et al.*, 2004)	*Ulmus minor*, *Ulmus laevis*	The same as previous method	The same as previous method

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
South-east, south-west, west and north-east Slo	'*Ca*. P. vitis'	FD-D, FD-C	***FD***	individual infected plants	*Vitis vinifera*	Leaves turn yellow or red depending on the cultivar.They roll downward and become brittle. Shoots show incomplete lignification and rows of black pustules develop on the green bark along the diseased branches. Fruit setting is reduced.	Real time PCR, nested PCR + RFLP
SLO	'*Ca*. P. vitis'	FD-C		also present in areas where FD had never previously been recorded in grapevine	*Clematis vitalba*	reddening, yellowing and rolling of the leaves at the end of the summer	Real time PCR, nested PCR + RFLP
all winegroving regions in Slo	BN phytoplasma		BN	widespread	*Vitis vinifera*	difficult to distinguish from the symptoms of FD infected grapevine	Real time PCR, nested PCR
	BN phytoplasma			individual infected plant	***Lycopersicon esculentum***		Real time PCR, nested PCR
SLO	BN phytoplasma				*Convolvulus arvensis*		Real time PCR, nested PCR
Infected areas: Primorska, Notranjska Present at low prevalence: Savinjska, Štajerska, Prekmurje	'*Ca*. P. prunorum'		ESFY	present only in areas where host crops are grown	*Prunus persica*	premature red color, leaf curling, line of necrotic tissue in the bark	Real time PCR, nested PCR + RFLP
	'*Ca*. P. prunorum'		ESFY		*Prunus armeniaca*	premature red color, leaf curling, line of necrotic tissue in the bark	Real time PCR, nested PCR + RFLP
	'*Ca*. P. prunorum'		ESFY		*Prunus domestica*	generally does not show symptoms	Real time PCR, nested PCR + RFLP
Infected areas: Primorska, Savinjska valley, Posavje, Štajerska	'*Ca*. P. pyri'		PD	present only in some areas where host crops are grown	*Pyrus communis*	premature red color, leaf curling, premature leaf drop, line of necrotic tissue in the bark	Real time PCR, nested PCR + RFLP
SLO	'*Ca*. P. mali'		AP	present at low prevalence	*Malus domestica*	witches' broom at the end of shoots, enlarged stipules, early leaf reddening	Real time PCR, nested PCR + RFLP
South-west Slo	'*Ca*. P. mali'			individual infected plants	*Prunus avium*	wilting, dying, floral and phloem necrosis	nested PCR + RFLP, sequencing
South-west Slo	'*Ca*. P. mali'			individual infected plants	*Prunus armeniaca*	stem necrosis and leaf wilting	nested PCR + RFLP, sequencing
South-west Slo	'*Ca*. P. mali'			individual infected plant	*Prunus domestica*	late blooming	nested PCR + RFLP, sequencing
Savinja valley	'*Ca*. P. asteris'			In several gardens	*Echinacea purpurea*	plant weakness, leaf yellowing, and floral malformations particularly virescence and phyllody	PCR, sequencing

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Scaphoideus titanus		moderate, established in all winegrowing regions, but not at all vineyards	*Ca*. P. vitis'	not detected yet	Real time PCR, nested PCR	*Vitis vinifera*	by sweep net sampling, yellow sticky traps	morphological
	Scaphoideus titanus (?)	moderate, established in all winegrowing regions, but not at all vineyards	BN phytoplasma	detected only once	Real time PCR, nested PCR	*Vitis vinifera*	by sweep net sampling, yellow sticky traps	morphological
Hyalesthes obsoletus		moderate, widely distributed	BN phytoplasma	moderate	nested PCR	*Urtica dioica, Convolvolus arvensis,* other herbaceous plants, occasionally *Vitis vinifera*	by sweep net sampling, yellow sticky traps	morphological
Euscelis incisus		high, widely distributed	BN phytoplasma		nested PCR	herbaceous plants	by sweep net sampling	morphological
Reptalus panzeri		low, widely distributed	BN phytoplasma	moderate	nested PCR	herbaceous plants, occasionally *Vitis vinifera*	by sweep net sampling	morphological
	Reptalus cuspidatus	locally common, widely spread in SW Slovenia	BN phytoplasma	not found yet (?)	nested PCR	herbaceous plants	by sweep net sampling	morphological
Cacopsylla pruni		high, widely distributed	'*Ca*. P. prunorum'	high (?)	nested PCR + RFLP	*Prunus* spp, especially *P. domestica, P. instititia, P. spinosa*	by sweep net sampling, yellow sticky traps	morphological
Cacopsylla pyri		high, widely distributed	'*Ca*. P. pyri'	high (?)	nested PCR + RFLP	*Pyrus communis*	by sweep net sampling	morphological
Cacopsylla pyricola		low to moderate, widely distributed	'*Ca*. P. pyri'	not tested		*Pyrus communis*	by sweep net sampling	morphological
	Orientus ishidae	moderate, limited distribution	'*Ca*. P. vitis'		Real time PCR, nested PCR + RFLP, sequencing	various woody and herbaceous plants, especially *Malus, Salix, Alnus, Diospyros kaki, Prunus spinosa,* etc.	by sweep net sampling	morphological

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COST Action FA0807
WG 2/Task 2 QUESTIONNAIRE

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Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region							
Region/s	**Phytoplasma/s**	**Strain/s**	**Phytoplasma disease**	**Incidence**	**Host/s**	**Symptoms**	**Detection method/s**
Spain	Ca.P.pyri		Pear decline	medium	Pear	**Slow decline**	**PCR**
Spain	Ca.P.prunorum		ESFY	medium	Plum, apricot	Vegetative disorders, chlorosis	PCR
Spain	Ca.P.prunorum		ESFY	low	Peach, nectarine	Chlorosis, leaf deformation	PCR
Basque country, Asturias (España)	Ca.P.mali		AP	low	Cider	Proliferation, floration disorders	PCR
Spain	Ca.P.solani	Tuf II / Tuf I (few)	Bois Noir, Stolbur in horticultural crops.	low	Grapevine, parsley, strawberry, carrot and other horticultural crops.	Yellows, leaf roll, mosaics, vein chlorosis, dwarf, flower sterility, fruit abortion.	PCR
Restricted to North of Catalonia and eradicated	Ca.P.vitis	D	Flavescence dorée (FD)	Eradicated	Grapevine	Yellows, mosaics, leaf roll,	PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region								
Vectors (aknowledged)	**Vectors (putative)**	**Population density**	**Phytoplasma/s**	**Infection rate**	**Detection method/s**	**Vector host\s**	**Collection method/s**	**Identification method/s**
C.pyri	C.pyri	high	Ca.P.pyri	6%	PCR	Pear		
C.pruni	C.pruni	low	Ca.P.prunorum	10-30%	PCR	Prunus mahleb P. spinosa Prunus sp.	Yellow traps	
C.picta	C.picta	medium	Ca.P.mali	30%	PCR	Malus sp.	Yellow traps	
Hyalesthes obsoletus	-Macrosteles quadripunctulatus -Euscelis obsoletus and others	low	Ca.P.solani Bois Noir phytoplasma	30-80% (Hyalesthes) 10-20% rest	PCR	-Convolvulus -Lavandula -Solanum nigrum	-aspirator - yellow traps	
Scaphoideus titanus		medium	There are not the FD in most of the places where the vector is present	n.d		grapevine	-Aspirator -Yellow traps	

Publications:

Laviña, A., Sabate, J., Batlle, A. **2011**. “Candidatus Phytoplas Mali”: Identification of potential insects vectors in Spanish apple orchards. Bulletin of insectology 64 126-127

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WG 2/Task 2 QUESTIONNAIRE

I

Title: Integrated Management of Phytoplasma Epidemics in Different Crop Systems
Working Group 2: Epidemiology and Vector Ecology
Task 2: MONITORING THE PRESENCE OF PHYTOPLASMA DISEASES AND THEIR PUTATIVE VECTORS IN DEFINED REGIONS THROUGH EUROPE

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Switzerland			Flavescence dorée Bois noir Stolbur ESFY Apple proliferation Pear decline Rubus stunt phytoplasma	Localised Generalised Episodic Localised Generalised Generalised Episodic	Grapevine Grapevine Potato… Stone fruits Apple Pear Blackberry		**PCR** **PCR** **PCR** **PCR** **PCR** **PCR** **PCR**

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Scaphoideus titanus		Localised	Flavescence dorée		PCR	Grapevine	Field sampling	visual
Hyalesthes obsoletus		Generalised	Bois noir		PCR	U. dioica, C. arvensis	" "	" "
Cacopsylla pruni		Generalised	ESFY		PCR	Wild prunus sp.	" "	" "

Publications:

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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
NL	Ca. Phytoplasma asteris		'lissers' (for hyacinth) 'grassy top' (for gladiolus)	Low	Hyacinthus, Gadiolus		PCR
NL	Ca. Phytoplasma mali		Apple proliferation	Low	Apple	Some proliferation and early leaf-reddening in autumn	PCR
NL	Ca. Phytoplasma pyri		Pear decline	Moderate	Pear	Early leaf-reddening in autumn and growth reduction the year after	PCR

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
	Cacopsylla melanoneura	Low						
Cacopsylla pyri		High	PD					
	Cacopsylla pyricola	Low	PD					
	Macrostelus sexnotatus	Moderate						

Publications:

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Your address		
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Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s
Hatay, Adana, Mersin,Antalya, Isparta, G.Antep Yalova	*Candidatus* Phytoplasma pruni	*imp*- I3 and I26 genotypes *aceF*-A17, A6, A5 and A8 genotypes	ESFY	Not widespread in commercial orchards (3.2 %) but widespread in collection orchards (54.80 %)	Apricot, plum, almond and *P. spinosa* Apple, Apricot	Early bud break, dieback	PCR/RFLP, phylogenetic analyses
Bursa	*Candidatus* Phytoplasma pyri	*imp*- I18 and I19 *aceF*- A10; A11; A24 and A20 genotypes	PD	Widespread (52.58%)	Pear	Reddening,slow dieback	PCR/RFLP, phylogenetic analyses
Isparta, Ankara, Mersin	*Candidatus* Phytoplasma mali	*Imp*- I25 *aceF*- A23 genotypes	AP	Not widespread	Apple, apricot	Latent	PCR/RFLP, phylogenetic analyses

Phytoplasma vectors (putative/acknowledged) identified in your country/region

Vectors (aknowledged)	Vectors (putative)	Population density	Phytoplasma/s	Infection rate	Detection method/s	Vector host\s	Collection method/s	Identification method/s
Cacopsylla pyri		Widespread	*Ca.* P. pyri	Unknown	Morphological, genitalia	Pear	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses
Cacopsylla pruni (Type B)		Not widespread	*Ca.* P. prunorum	5.45 %	Morphological, genitalia and molecular	*P. spinosa*, *Prunus* spp., *Abies* spp.	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses
C. picta		Not Widespread	*Ca.* P. mali and *Ca.* P. prunorum	12.50%	Morphological, genitalia	Apple	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses
	C. crataegi	Not widespread	*Ca.* P. mali	Unknown	Morphological, genitalia	*Crateagus* spp	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses
	C. melanoneura	Not widespread	*Ca.* P. pyri	Unknown	Morphological, genitalia	*Crateagus* spp	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses
	C. affinis	Not widespread	*Ca.* P. pyri	Unknown	Morphological, genitalia	*Crateagus* spp	Beat tray, Sweep net	PCR/RFLP, phylogenetic analyses

Publications:

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I can confirm that the UK does not have FD or BN. ESFY is only present at one location is classed as 'under eradication'. As far as I know there is no AP or PD present.

As far as I am aware, we don't have any of those phytoplasmas here in the UK – AP has occasionally been detected in the past, but no-one has reported it for many years.

Presence of phytoplasma diseases detected in your country/region

Region/s	Phytoplasma/s	Strain/s	Phytoplasma disease	Incidence	Host/s	Symptoms	Detection method/s