

# **D**EFORMACIONES EN PINO RELACIONADAS CON *'Candidatus Phytoplasma pini'* EN LA COMUNIDAD VALENCIANA



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Septiembre 2015

TRABAJO FIN DE MÁSTER  
PRODUCCIÓN VEGETAL Y  
ECOSISTEMAS AGROFORESTALES



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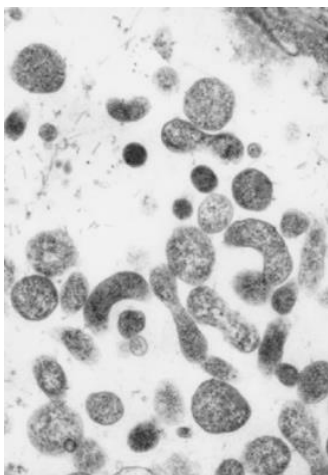
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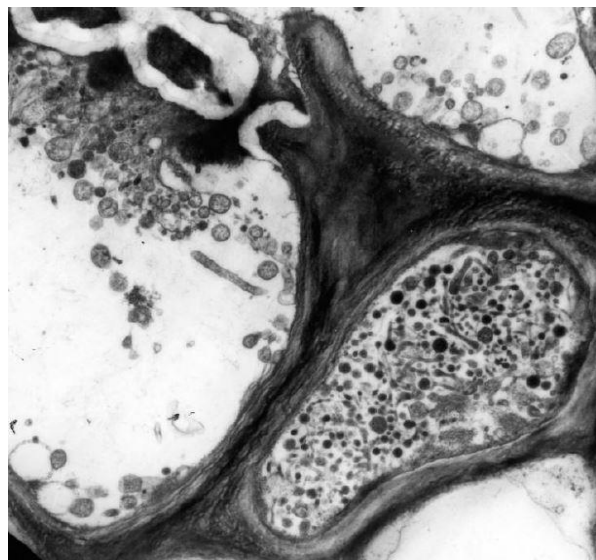
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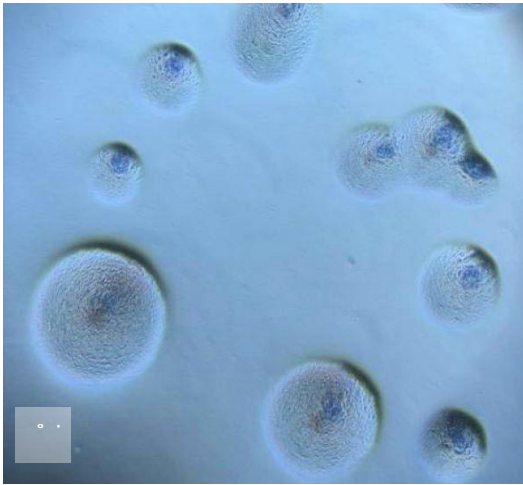
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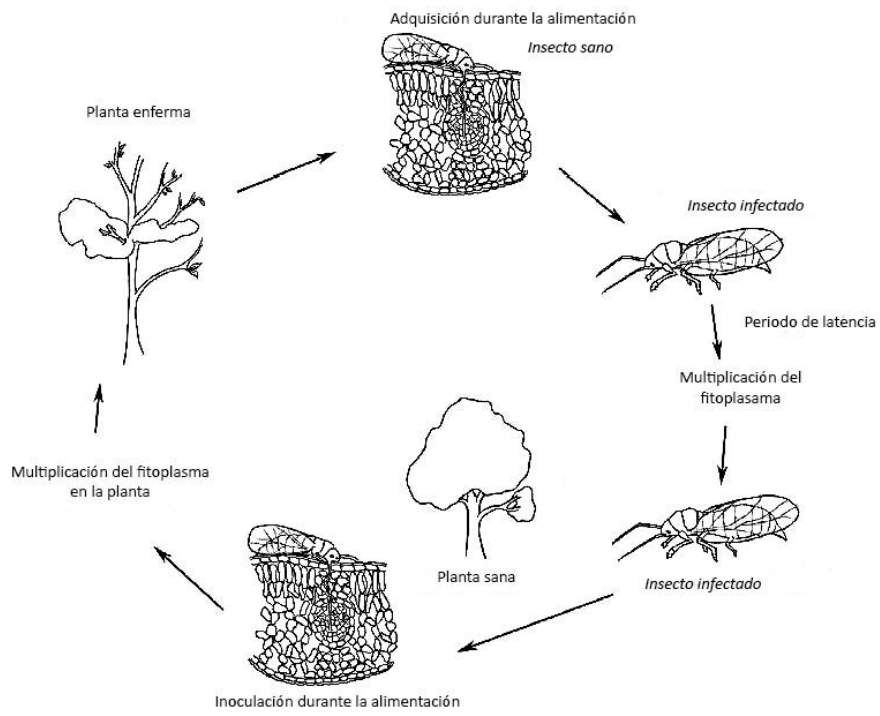
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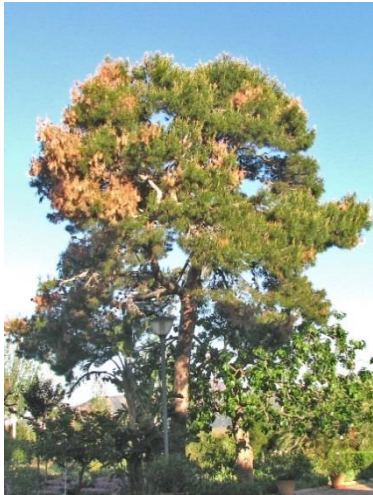
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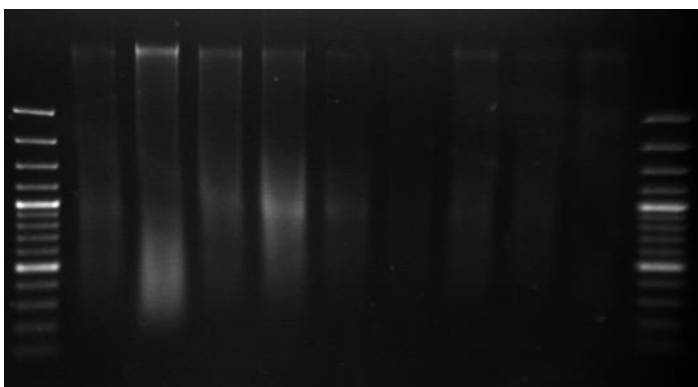
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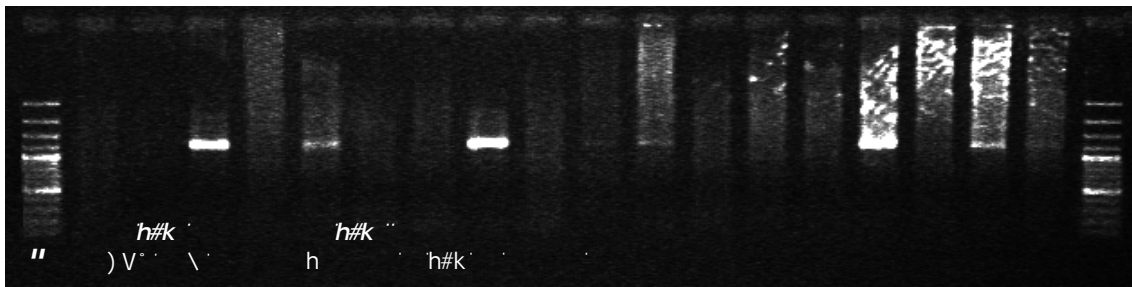
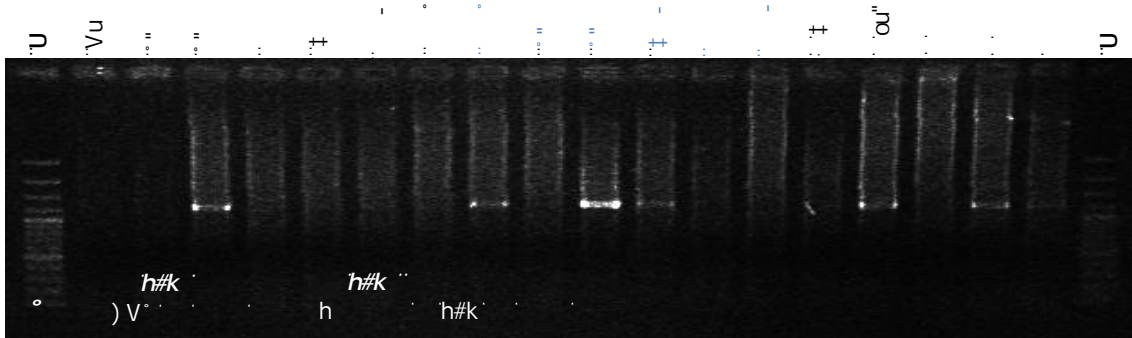
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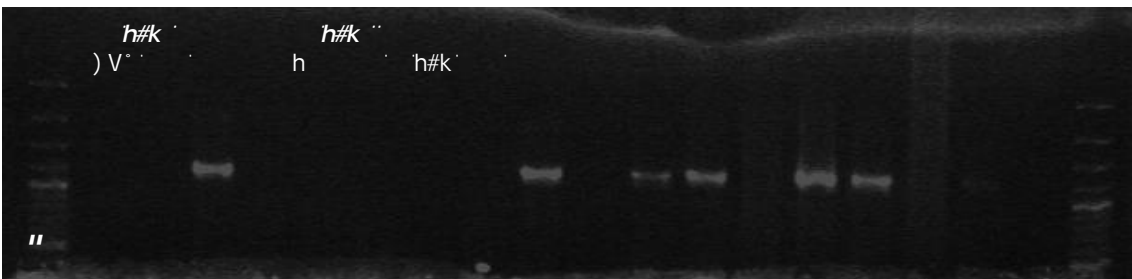


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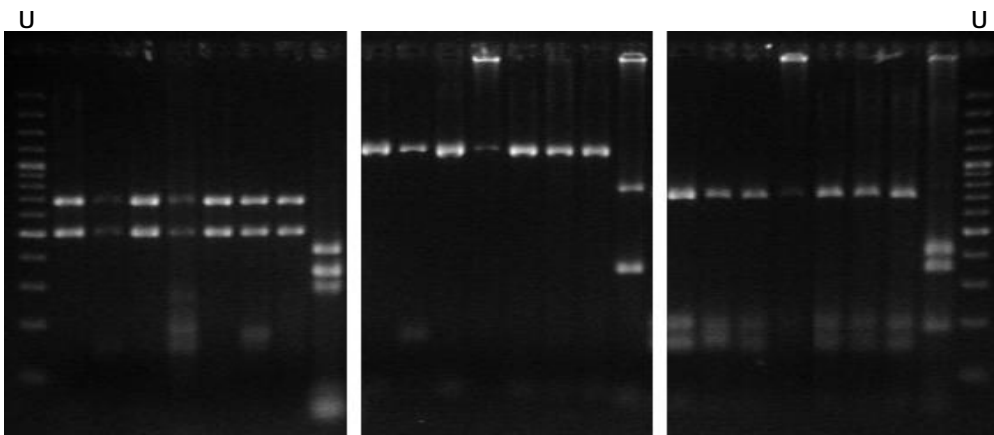
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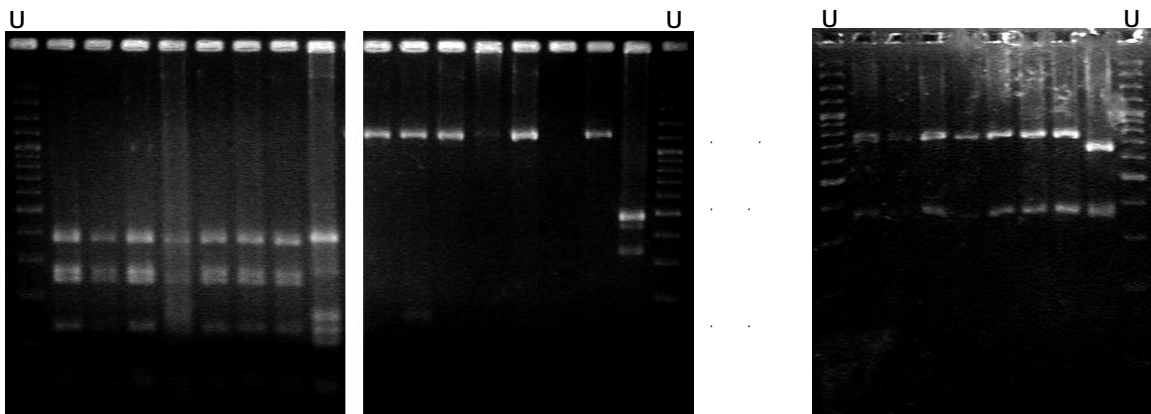
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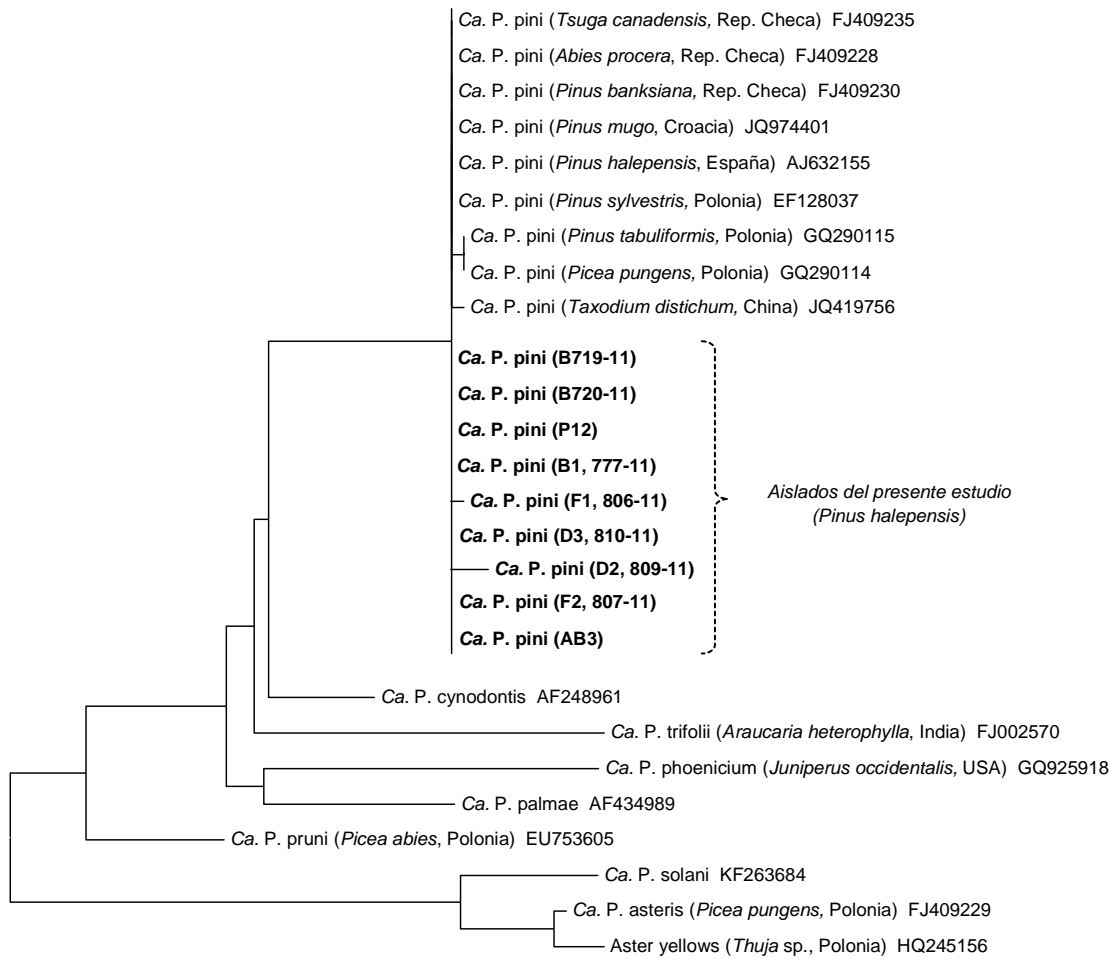
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Continuación Tabla 6.1.

Síntoma	Código árbol	Término Municipal	Análisis arb. del entorno	Toma de muestra		Extracción	Nested PCR	Result. análisis	Identificación
				Pva - Verano	Otoño - Invierno				
FOGONAZO	F1	Bigastro		05/07/11				+	
	F2	Callosa de Segura		05/07/11				+	
	F3	Sagunt		09/05/12		21/10/13	23/10/13	-	
	F4	Benicàssim	9 arb.	05/07/12		27/11/13	02/12/13	-	
	F5	Bocairent				03/10/13	11/10/13	-	
	F6	Yatova	10 arb.	18/07/12		03/10/13	11/10/13	-	
	F7	Betera			21/11/13	27/11/13	02/12/13	-	
	F8	Pobla Tornesa		20/02/13		04/10/13	11/10/13	-	
DEFORMACIÓN	D1	Castellón		15/06/11				-	
	D1V	Castellón			10/12/13	11/12/13	18/12/13	-	
	D2	Montroi		04/07/11				+	
	D3	Villalonga		04/07/11				+	
	D4	Guadalest			20/11/13	27/11/13	02/12/13	+	Ca. P. pini (RFLPs)
	D5	Agres		01/07/11				-	
	D6	Ademuz		01/07/11				-	
PUNTISECADO	P1	Domeño		16/06/11				-	
	P2	Chelva		16/06/11				-	
	P3	Chelva		16/06/11				-	
	P4	Chelva			12/11/12	04/10/13	11/10/13	-	
	P5	Chelva			12/11/12	04/10/13	11/10/13	-	
		Chelva			27/11/13	10/12/13	17/12/13	-	
	P6	Chelva			12/11/12	04/10/13	11/10/13	-	
		Chelva			27/11/13	10/12/13	17/12/13	-	
	P7	Chelva			12/11/12	07/10/13	11/10/13	-	
		Chelva			27/11/13	10/12/13	17/12/13	-	
	P8	Chelva			12/11/12	07/10/13	11/10/13	-	
		Chelva			27/11/13	10/12/13	17/12/13	-	
	P9	Requena			14/11/12	07/10/13	11/10/13	-	
		Requena			22/11/13	10/12/13	17/12/13	-	
P10	Cofrentes			14/11/12	07/10/13	11/10/13	-		
	Cofrentes			25/11/13	10/12/13	17/12/13	-		
P11	Cortes de Pallas			14/11/12	07/10/13	11/10/13	+	No se lee (muy sucia)	
	Cortes de Pallas			25/11/13	10/12/13	17/12/13	-		
P12	Cortes de Pallas			14/11/12	07/10/13	11/10/13	+	99% ut id Ca. P. pini JQ974401	
	Cortes de Pallas			25/11/13	10/12/13	18/12/13	+	Ca. P. pini RFLPS	
P13	Jarafuel			12/12/13	17/12/13	18/12/13	+	Ca. P. pini RFLPS	
P14	Jarafuel			12/12/13	17/12/13	18/12/13	-		

## 6.2. Prospecciones de árboles asintomáticos del entorno de los árboles con síntomas

En las tablas siguientes se disponen los datos de los muestreos y análisis de los árboles del entorno de árboles sintomáticos. Se distinguen las dos épocas de muestreo: verano (tabla 6.2.1) y otoño (tabla 6.2.2).

Tabla 6.2.1. Muestreos verano. Árboles de entorno.

Árbol sintomático	Código árbol entorno	Código agrupación para análisis	Tomada	Extracción	Nested PCR	Resultado PCR
B5	B5_AR1	B5_AR_A	18/07/12	21/10/13	23/10/13	-
	B5_AR2		18/07/12	21/10/13	23/10/13	-
	B5_AR3		18/07/12	21/10/13	23/10/13	-
	B5_AR4	B5_AR_B	18/07/12	21/10/13	23/10/13	-
	B5_AR5		18/07/12	21/10/13	23/10/13	-
	B5_AR6		18/07/12	21/10/13	23/10/13	-
	B5_AR7	B5_AR_C	18/07/12	21/10/13	23/10/13	-
	B5_AR8		18/07/12	21/10/13	23/10/13	-
	B5_AR9		18/07/12	21/10/13	23/10/13	-
B9	B9_AR022	B9_AR_A	26/07/12	14/10/13	15/10/13	-
	B9_AR023		26/07/12	14/10/13	15/10/13	-
	B9_AR024		26/07/12	14/10/13	15/10/13	-
	B9_AR025	B9_AR_B	26/07/12	14/10/13	15/10/13	-
	B9_AR026		26/07/12	14/10/13	15/10/13	-
	B9_AR027		26/07/12	14/10/13	15/10/13	-
	B9_AR028	B9_AR_C	26/07/12	14/10/13	15/10/13	-
	B9_AR029		26/07/12	14/10/13	15/10/13	-
	B9_AR030		26/07/12	14/10/13	15/10/13	-
B9_AR031	26/07/12		14/10/13	15/10/13	-	
B10	B10_AR02	B10_AR_A	26/07/12	14/10/13	15/10/13	-
	B10_AR03		26/07/12	14/10/13	15/10/13	-
	B10_AR04		26/07/12	14/10/13	15/10/13	-
	B10_AR05		26/07/12	14/10/13	15/10/13	-
	B10_AR06	B10_AR_B	26/07/12	14/10/13	15/10/13	-
	B10_AR07		26/07/12	14/10/13	15/10/13	-
	B10_AR08		26/07/12	14/10/13	15/10/13	-
	B10_AR09	B10_AR_C	26/07/12	14/10/13	15/10/13	-
	B10_AR010		26/07/12	14/10/13	15/10/13	-
B10_AR011	26/07/12		14/10/13	15/10/13	-	
AB7	AB7_AR016	AB7_AR_A	26/07/12	14/10/13	15/10/13	-
	AB7_AR017		26/07/12	14/10/13	15/10/13	-
	AB7_AR018		26/07/12	14/10/13	15/10/13	-
	AB7_AR019	AB7_AR_B	26/07/12	14/10/13	15/10/13	-
	AB7_AR020		26/07/12	14/10/13	15/10/13	-
F4	F4_AR01	F4_AR_A	05/07/12	21/10/13	23/10/13	-
	F4_AR02		05/07/12	21/10/13	23/10/13	-
	F4_AR03		05/07/12	21/10/13	23/10/13	-
	F4_AR04	F4_AR_B	05/07/12	21/10/13	23/10/13	-
	F4_AR05		05/07/12	21/10/13	23/10/13	-
	F4_AR07		05/07/12	21/10/13	23/10/13	-
	F4_AR08	FA_AR_C	05/07/12	21/10/13	23/10/13	-
	F4_AR09		05/07/12	21/10/13	23/10/13	-
	F4_AR10		05/07/12	21/10/13	23/10/13	-
	F4_AR10		05/07/12	21/10/13	23/10/13	-
F6	F6_AR01	F6_AR_A	18/07/12	21/10/13	23/10/13	-
	F6_AR02		18/07/12	21/10/13	23/10/13	-
	F6_AR03		18/07/12	21/10/13	23/10/13	-
	F6_AR04	F6_AR_B	18/07/12	21/10/13	23/10/13	-
	F6_AR05		18/07/12	21/10/13	23/10/13	-
	F6_AR06		18/07/12	21/10/13	23/10/13	-
	F6_AR07	F6_AR_C	18/07/12	21/10/13	23/10/13	-
	F6_AR08		18/07/12	21/10/13	23/10/13	-
	F6_AR09		18/07/12	21/10/13	23/10/13	-
	F6_AR10		18/07/12	21/10/13	23/10/13	-

Tabla 6.2.2. Muestras otoño. Árboles de entorno.

Árbol sintomático	Código árbol entorno	Código agrupación para análisis	Tomada	Extracción	PCR	Resultado PCR
B9	B9_ARs_140	B9_AR_A	25/11/13	11/12/13	18/12/13	-
	B9_ARs_143		25/11/13	11/12/13	18/12/13	-
	B9_ARs_148		25/11/13	11/12/13	18/12/13	-
	B9_ARs_149	B9_AR_B	25/11/13	11/12/13	18/12/13	-
	B9_ARs_152		25/11/13	11/12/13	18/12/13	-
	B9_AR_144	B9_AR_C	25/11/13	11/12/13	18/12/13	-
	B9_AR_147		25/11/13	11/12/13	18/12/13	-
	B9_AR_150		25/11/13	11/12/13	18/12/13	-
	B9_AR_151	B9_AR_D	25/11/13	11/12/13	18/12/13	-
B9_AR_153	25/11/13		11/12/13	18/12/13	-	
AB7	AB7_AR_016	AB7_AR_A	22/11/13	11/12/13	18/12/13	-
	AB7_AR_017		22/11/13	11/12/13	18/12/13	-
	AB7_AR_018		22/11/13	11/12/13	18/12/13	-
	AB7_AR_019	AB7_AR_B	22/11/13	11/12/13	18/12/13	-
	AB7_AR_020		22/11/13	11/12/13	18/12/13	-
	AB7_AR_021	AB7_AR_C	22/11/13	11/12/13	18/12/13	-
	AB7_ARs_022		22/11/13	11/12/13	18/12/13	-
	AB7_ARs_023		22/11/13	11/12/13	18/12/13	-
	AB7_ARs_024	AB7_AR_D	22/11/13	11/12/13	18/12/13	-
AB7_ARs_025	22/11/13		11/12/13	18/12/13	-	
B10	B10_AR02	B10_AR_A	22/11/13	11/12/13	18/12/13	-
	B10_AR03		22/11/13	11/12/13	18/12/13	-
	B10_AR04		22/11/13	11/12/13	18/12/13	-
	B10_AR05		22/11/13	11/12/13	18/12/13	-
	B10_AR06	B10_AR_B	22/11/13	11/12/13	18/12/13	-
	B10_AR07		22/11/13	11/12/13	18/12/13	-
	B10_AR08		22/11/13	11/12/13	18/12/13	-
	B10_AR09	B10_AR_C	22/11/13	11/12/13	18/12/13	-
	B10_AR010		22/11/13	11/12/13	18/12/13	-
	B10_AR011		22/11/13	11/12/13	18/12/13	-

### 6.3. Muestreo de plántulas procedentes de semilla de árboles sintomáticos

En la tabla siguiente se disponen los datos de los muestreos y análisis de las plantas resultantes de las semillas de árboles sintomáticos. Solo el parental B3 resultó positivo a 'Ca. P. pini'.

Tabla 6.3. Muestreo y análisis plantas procedentes de semilla de árboles sintomáticos.

Parental	Planta	Agrupación para análisis	Muestreo RAIZ	Muestreo parte AÉREA	Extracción	PCR	Resultado PCR
B3	SB3_3	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SB3_5	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SB3_6	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SB3_7	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SB3_8	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
AB2	SB3_12	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB2_1	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB2_2	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB2_3	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB2_4	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
AB5	SAB2_5	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB2_6	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
AB5	SAB5_3	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
	SAB5_4	Planta sintomática / Análisis individual	7/11/13	18/11/13	19/11/13	14/01/14	-
D6	SD6_1	SD6_A	7/11/13	18/11/13	27/11/13	20/12/13	-
	SD6_2		7/11/13	18/11/13	27/11/13	20/12/13	-
	SD6_3 (1)		7/11/13	18/11/13	27/11/13	20/12/13	-
	SD6_3 (2)	SD6_B	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_4		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_5		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_6	SD6_C	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_7		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_8		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_9	SD6_D	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_10		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_11		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_12	SD6_E	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_13		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_14		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_15	SD6_F	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_16		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_17		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_18	SD6_G	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_19		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_20		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_21	SD6_H	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_22		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_23		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_24	SD6_I	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_24 (2)		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_25		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_26	SD6_J	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_27		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_28		7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_29	SD6_K	7/11/13	18/11/13	21/11/13	20/12/13	-
	SD6_30		7/11/13	18/11/13	21/11/13	20/12/13	-
SD6_31	7/11/13		18/11/13	21/11/13	20/12/13	-	
SD6_32	SD6_L	7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_33		7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_34		7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_35	SD6_M	7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_36		7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_37		7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_38	SD6_N	7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_39		7/11/13	18/11/13	21/11/13	20/12/13	-	
SD6_40		7/11/13	18/11/13	21/11/13	20/12/13	-	

Continuación Tabla 6.3.

Parental	Planta	Agrupación para análisis	Muestreo RAIZ	Muestreo parte AÉREA	Extracción	PCR	Resultado PCR
F3	SF3_1	SF3_A	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_2		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_3		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_4	SF3_B	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_5		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_9		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_10	SF3_C	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_11		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_12		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_13	SF3_D	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_14		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_15		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_16	SF3_E	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_17		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_18		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_19	SF3_F	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_20		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_21		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_22	SF3_G	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_23		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_24		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_25	SF3_H	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_26		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_27		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_28	SF3_I	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_30		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_31		7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_32	SF3_J	7/11/13	18/11/13	26/11/13	20/12/13	-
	SF3_33		7/11/13	18/11/13	26/11/13	20/12/13	-

