

# Two Species of *Phytophthora* and Other Root Pathogens Isolated from Lavender Plants from 11 States in 2015

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## Objectives

- 1.To determine if Phytophthora root and crown rots (PRCRs) were a problem on field-grown lavender plants in 2015
- 2.To isolate and identify the species of *Phytophthora* causing PRCRs on lavender

## Introduction

*Phytophthora nicotianae* is a cosmopolitan pathogen with a wide host range—including English lavender (*Lavandula angustifolia*). It also is the most common species of *Phytophthora* attacking herbaceous ornamental plants in the southeastern U.S. In June 2015, *P. nicotianae* was isolated from lavender plants with symptoms of *Phytophthora* root and crown rots (PRCRs) that recently were planted at a farm in Greer, SC. Other growers from the US Lavender Growers Association (USLGA) also were seeing symptoms of PRCRs—particularly on recently-planted, nursery-grown plants. Therefore, lavender growers were encouraged to get plants tested for PRCRs, and the Clemson University Plant Problem Clinic offered to process samples from USLGA members.



Lavender plant with PRCRs ready for isolation



Lavender field site in Greer, SC: Plants that died from PRCRs have been removed

## Methods and Materials

- Root and crown tissue were taken from the margins of advancing lesions and areas that were discolored or rotten
- Tissues were rinsed thoroughly with running water until all soil and debris were removed
- Roots were surface disinfested for 1 minute with 10% Bleach solution and rinsed with distilled water –if root tissue was taken from young or macerated roots, sterilization was not used
- Crown tissue was not surface disinfested since it was removed from beneath the outer layer of the stem
- Crown tissue was placed on PARP-V8 selective medium and roots on PARPH-V8 medium; 2 plates with 5 pieces each

## Results

- All results are summarized in Tables 1 and 2
- Between Jul and Nov 2015, 31 plant samples were received from 13 growers in 11 states
- All submitted plants were cultivars of *L. angustifolia* and *L. x intermedia*
- Root and crown pathogens were detected in 26 plant samples from 12 growers in 10 states
- *Phytophthora* spp. were isolated from 24 plant samples from these 12 growers
  - *P. nicotianae* was isolated from 19 plants from 11 growers in 10 states
  - *P. palmivora* was isolated from 4 plants from 3 growers in 3 states
  - *Phytophthora* sp. was isolated from only 1 plant in CO
- On 3 plants with PRCRs, *Fusarium* spp. also were isolated
- *Thielaviopsis basicola* was isolated from 1 plant from each of the 2 growers in VA
- No root and crown pathogens were detected in 5 samples—one from a grower in TX
- *P. nicotianae* was isolated most frequently from cultivars of hybrid lavender (*L. x intermedia*)
- *P. palmivora* was isolated most frequently from cultivars of English lavender (*L. angustifolia*)



Foliar symptoms of PRCRs in the field



Lavender roots with symptoms of PRCRs

**Table 1.** Species of *Phytophthora* and Two Fungi Identified on Lavender Plants in 2015

State	Grower ID	Sample no.	Host plants: <i>Lavandula</i> spp.		Diagnosis	
			Species	Cultivar	Disease*	Pathogen
CA	CA-1	1214	<i>L. × intermedia</i>	Grosso	PRCR	<i>P. nicotianae</i>
CO	CO-2	1178	<i>L. angustifolia</i>	Buena Vista	PRR	<i>Phytophthora</i> sp.
		1201	<i>L. angustifolia</i>	Buena Vista	PRR	<i>P. palmivora</i>
		1202	<i>L. angustifolia</i>	Maillette	PRCR	<i>P. nicotianae</i>
		1203	<i>L. angustifolia</i>	Melissa Lilac	PRCR	<i>P. palmivora</i>
IL	IL-1	1230	<i>L. × intermedia</i>	Provence	PRCR	<i>P. nicotianae</i>
		1231	<i>L. × intermedia</i>	Phenomenal	PRCR	<i>P. nicotianae</i>
KY	KY-1	1199	<i>L. × intermedia</i>	Grosso	PRCR	<i>P. nicotianae</i>
LA	LA-1	1076	<i>L. × intermedia</i>	Phenomenal	PRR	<i>P. nicotianae</i>
NH	NH-1	1166	<i>L. × intermedia</i>	Grosso	PRCR	<i>P. nicotianae</i>
NJ	NJ-1	1123	<i>L. × intermedia</i>	Grosso	PRR	<i>P. nicotianae</i>
		1124	<i>L. × intermedia</i>	Provence	PRCR	<i>P. nicotianae</i>
		1125	<i>L. angustifolia</i>	Hidcote	PRCR	<i>P. palmivora</i>
					FCR	<i>Fusarium</i> sp.
		1126	<i>L. × intermedia</i>	Phenomenal	PRCR	<i>P. nicotianae</i>
					FCR	<i>Fusarium</i> sp.
SC	SC-1	450	<i>L. × intermedia</i>	Phenomenal	PRCR	<i>P. nicotianae</i>
		451	<i>L. × intermedia</i>	Impress Purple	PRCR	<i>P. nicotianae</i> **
		718	<i>L. angustifolia</i>	Hidcote	PRCR	<i>P. nicotianae</i>
		1028-A	<i>L. × intermedia</i>	Provence	PRR	<i>P. nicotianae</i>
		1028-B	<i>L. angustifolia</i>	Hidcote	PRCR	<i>P. nicotianae</i>
					FCR	<i>Fusarium</i> sp.
TN	TN-1	1194-B	<i>L. × intermedia</i>	Phenomenal	PRCR	<i>P. nicotianae</i>
		1194-D	<i>L. × intermedia</i>	Phenomenal	PRCR	<i>P. palmivora</i>
VA	VA-1	1102	<i>L. angustifolia</i>	Melissa	PRR	<i>P. nicotianae</i>
		1103	<i>L. angustifolia</i>	Royal Velvet	BRR	<i>Thielaviopsis basicola</i>
		1104	<i>L. × intermedia</i>	Provence	PRCR	<i>P. nicotianae</i>
	VA-2	1115	<i>L. × intermedia</i>	Provence	PRR	<i>P. nicotianae</i>
		1116	<i>L. angustifolia</i>	Royal Velvet	BRR	<i>Thielaviopsis basicola</i>

\*Disease: PRCR = Phytophthora root and crown rot; PRR = Phytophthora root rot;

FCR = Fusarium crown rot; BRR = black root rot

\*\* Baited from soil because plant was too decayed for isolation

**Table 2.** Distribution of Pathogens on Lavender Plants in 2015

Pathogen		Numbers of:			No. of Isolations from:	
Genus	Species	States	Samples	Cultivars	Species	Cultivars
<i>Phytophthora</i>	<i>nicotianae</i>	10	19	7	<i>L. angustifolia</i> -4	Hidcote-2
						Maillette-1
						Melissa-1
					<i>L. x intermedia</i> -15	Grosso-4
						Impress Purple-1
						Phenomenal-5
						Provence-5
<i>Phytophthora</i>	<i>palmivora</i>	3	4	4	<i>L. angustifolia</i> -3	Buena Vista-1
						Hidcote-1
						Melissa Lilac-1
					<i>L. x intermedia</i> -1	Phenomenal-1
<i>Phytophthora</i>	sp.	1	1	1	<i>L. angustifolia</i> -1	Buena Vista-1
<i>Fusarium</i>	sp.	2	3	2	<i>L. angustifolia</i> -2	Hidcote-2
					<i>L. x intermedia</i> -1	Phenomenal-1
<i>Thielaviopsis</i>	<i>basicola</i>	1	2	1	<i>L. angustifolium</i> -2	Royal Velvet-2

## Conclusions

- PRCRs were a problem on field-grown lavender plants in 2015 all across the country
- Some of these infections may have come from the nursery
- *P. nicotianae* was the most frequently isolated species
- Previously, *P. nicotianae* and *P. palmivora* have been documented as pathogens of English lavender, *L. angustifolia*
- PRCRs have not been documented on hybrid lavender, *L. x intermedia*
- Hybrid lavender may be more susceptible then English lavender to *P. nicotianae*