

# National *Phytophthora ramorum* Early Detection Surveys for Forests 2003-2005

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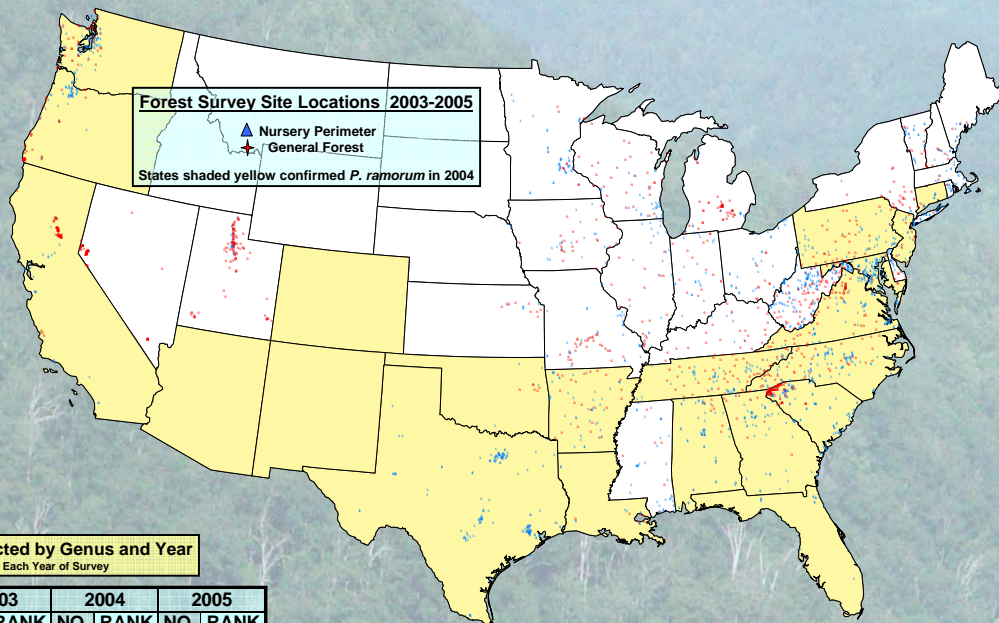
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## ABSTRACT

*Phytophthora ramorum* diseases in US forests landscapes have been limited to the west coast since the first detections in the mid-1990's. However, a risk map generated from the integration of climatic variables, host abundance, and potential pathways of pathogen introduction illustrated the vulnerability of other ecosystems outside the west coast. Annual risk-based terrestrial surveys of general forest areas and forested perimeters of woody ornamental nurseries began in 2003 in 7 states. Symptomatic host genera were collected from 4-100 meter transects of variable width at each location. Surveys were greatly expanded in 2004 after the accidental distribution of the pathogen across the country on infected woody ornamentals originating from west coast nurseries. Field and laboratory protocols were modified only slightly from year to year, with the largest change being the expansion of the target host list in 2004. The NEPDN Regional Lab at Cornell University is one of more than 20 labs nationally providing *P. ramorum* molecular diagnostic services to the forest survey.

Cooperators in 39 states surveyed 2526 locations from 2003 through 2005 and submitted 8683 samples from 39 different host genera for molecular diagnosis of *P. ramorum* infection. The pathogen was detected in only 2 samples during these surveys (both *Umbellularia californica* from San Francisco County, CA during 2004).

Stream sampling methods were field tested on a limited basis in 2005 using rhododendron leaves as *Phytophthora* bait. Favorable results led to a 2006 pilot survey in 10 states conducted concurrently with terrestrial surveys. Terrestrial and stream survey results from 2006 will be reported at the SOD Science Symposium III in March, 2007, but preliminary analysis of data ensures that risk-based stream sampling will replace terrestrial forest surveys in 2007.



## Number of Survey Locations by State and Type

NP = Nursery Perimeter GF = General Forest

State	Total	NP	GF
AL	63	56	7
AR	65	42	23
CA	84	22	62
CT	11	9	2
DE	20	13	7
FL	14	14	0
GA	73	59	14
IA	43	21	22
IL	40	21	19
IN	37	21	16
KS	14	5	9
KY	30	6	24
LA	16	11	5
MA	20	18	2
MD	97	86	11
ME	16	13	3
MI	59	14	45
MN	63	50	13
MO	60	30	30
MS	42	36	6
NC	129	87	42
NH	15	8	7
NJ	20	11	9
NV	61	0	61
NY	53	29	24
OH	41	31	10
OK	10	4	6
OR	89	50	39
PA	76	44	32
RI	10	9	1
SC	192	91	101
TN	106	49	57
TX	170	170	0
UT	118	15	30
VA	135	86	49
VT	32	22	10
WA	111	73	18
WI	61	29	32
WV	230	159	71
<b>Grand Total</b>	<b>2526</b>	<b>1514</b>	<b>919</b>

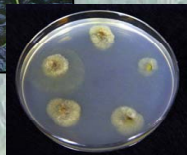
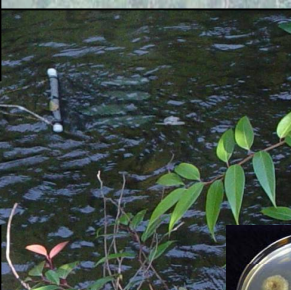
## Number of Samples Collected by Genus and Year

Top 10 Genera Shown for Each Year of Survey

GENUS	OVERALL		2003		2004		2005	
	NO.	RANK	NO.	RANK	NO.	RANK	NO.	RANK
<i>Acer</i>	1810	1	11	6	970	1	829	1
<i>Lonicera</i>	1368	2	17	5	712	3	639	2
Unidentified	1342	3	284	2	850	2	208	7
<i>Kalmia</i>	1077	4	363	1	437	4	277	4
<i>Quercus</i>	886	5	175	4	295	5	416	3
<i>Rhododendron</i>	732	6	231	3	257	6	244	5
<i>Vaccinium</i>	452	7	0	234	7	218	6	
<i>Viburnum</i>	241	8	3	8	108	8	130	8
<i>Hamamelis</i>	154	9	0	83	9	71	9	
<i>Aesculus</i>	89	10	0	43	11	46	10	
<i>Prunus</i>	84	11	0	64	10	20	17	
<i>Castanea</i>	40	15	8	7	27	14	5	21
<b>GRAND TOTAL</b>	<b>8683</b>		<b>1092</b>		<b>4263</b>		<b>3328</b>	

## Number of Samples Collected by Tissue Type and Year

TISSUE TYPE	OVERALL	2003	2004	2005
Leaf	8057	973	4038	3046
Bark	454	90	167	197
Twig	172	29	58	85
<b>GRAND TOTAL</b>	<b>8683</b>	<b>1092</b>	<b>4263</b>	<b>3328</b>



## Stream Baiting Methods Development- 2005

Number of *Phytophthora* spp. Recovered from Unwounded Rhododendron Leaves by Month

STREAM	MONTH						
	APR	MAY	JUNE	JULY	AUG	SEPT	OCT
Davidson River	1	3	0	4	1	2	0
S. Mills River	3	2	1	2	1	0	2
Big Creek	0	0	2	0	0	0	0
Fletcher Creek	1	2	0	1	1	0	1
Bent Creek	2	1	1	1	1	1	1
SPECIES RECOVERED	gonapodyides citricola Group E	gonapodyides citricola Group E	gonapodyides citricola Group G	gonapodyides citricola hevaea Group C Group F	citrophthora citricola	gonapodyides citricola Group G	gonapodyides citricola Group G

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