

Two simple inoculation methods for Phytophthora blight and root rot studies

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Hinodegiri azalea

Phytophthora inoculum

- Rice grain method
 - 25 g long grain rice
 - 18 ml deionized water
 - Autoclave 40 min

Holmes, KA and Benson, DM. 1994
Plant Disease 78:193-199.



Next day

- 'Stir up' rice mat with bent rod



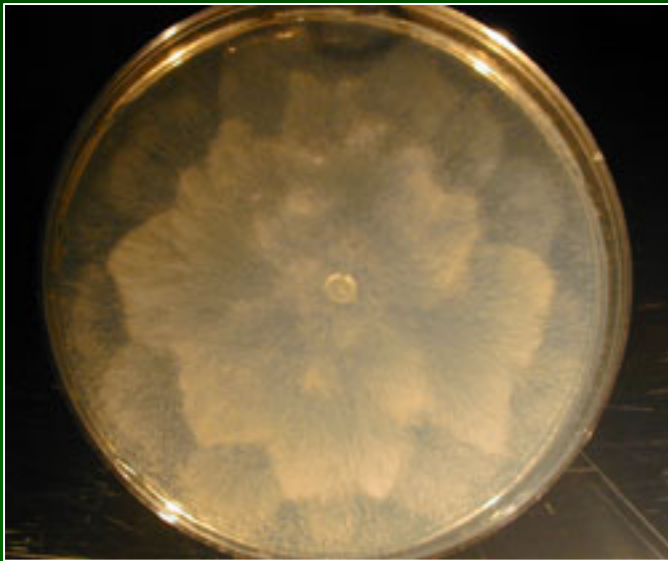
Loosen mat & separate grains

- Autoclave 2nd time: 40 min



Rice grain method

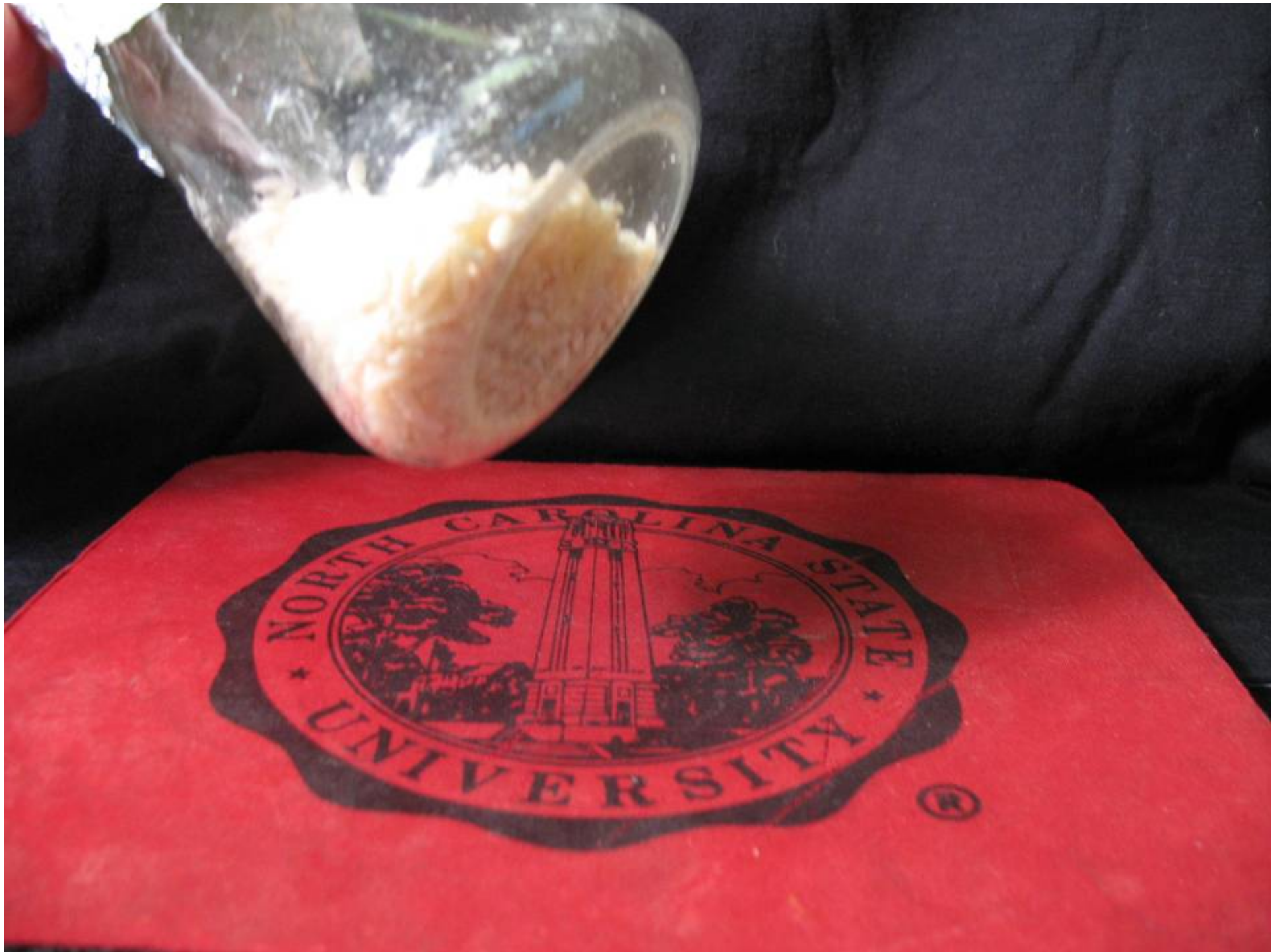
- Transfer agar disks



How many rice grains?







'Bump flask' each day

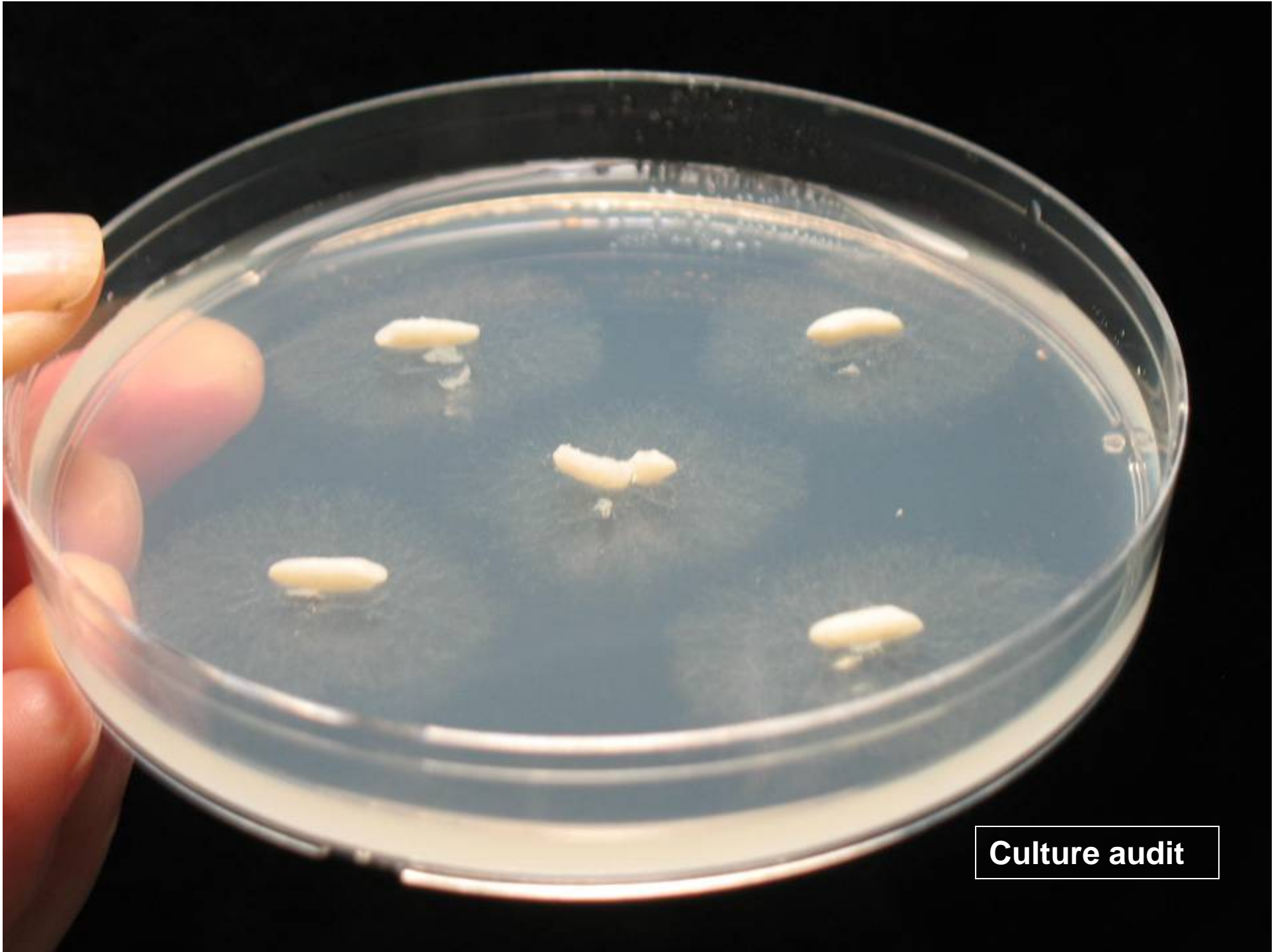




Uncultured rice



14-day-old culture



Culture audit

Local inoculum placement

- Whole rice grains
 - Host/Cultivar evaluations
 - Fungicide trials
 - Pathogenicity tests









2 grains/hole; 3 holes/pot



Inoculation time: approx. 60 plants/person/hour

Foliar ratings



Foliage symptoms: root rot



Scale: 1 = Healthy; 4 = Dead

Root symptoms



Controls





Root rot rating

- 1 = healthy, full root ball,
- 2 = some root rot, less than full root ball,
- 3 = severe root rot, 50% of root system necrotic,
- 4 = very severe root rot, root ball falls apart,
- and 5 = plant dead, all roots necrotic.

Year to year: consistency

2006

Treatment and Rate/100 gal	Application	Foliar rating			Top wt (oz)	Root rot ^y
		Jul 20	Aug 18	Sep 7		
Untreated control		2.4 b ^z	2.9 bc	2.9 b	0.59 d	2.9 b
Aliette 80WP 80 oz	Spray	1.1 c	1.3 f	1.4 e	2.09 ab	1.0 c
Non-inoculated control		1.0 c	1.6 def	1.6 cde	1.74 ab	1.0 c

2004

Treatment and rate /100 gal applied at a 30-day interval	Application	Disease severity ^z		Top wt oz	Root rot (1-5) ^y
		22 Jul	09 Sep		
Untreated control		2.4 a ^x	3.0 a	0.7 e	3.0 a
Aliette 80W 80.0 oz.	Spray	1.0 b	1.2 c	2.2 abc	1.2 c
Non-inoculated control		1.2 b	1.0 c	2.3 abc	1.0 c

Hinodegiri azalea

Rice grain no. & Disease

Hinodegiri azalea: June 6 – September 19, 2006

Treatment	Top wt. (g)	Root rot (1-5)
Untreated	29 a	1.2 b
1 rice gr/pot	25 a	2.6 ab
3 rice gr/pot	25 a	1.8 ab
6 rice gr/pot	18 ab	2.0 ab
9 rice gr/pot	7 b	3.2 a



Pot volume = 2.5 L

Uniform inoculum placement

- Rice grain particles
 - Pre- & post-emergence damping-off studies



Pulverize & Sieve



No. 10 sieve with
2-mm-openings



Weigh inoculum

- How much to use?
 - Trial & error



Adding carrier

- Surface applications



Blending carrier & inoculum



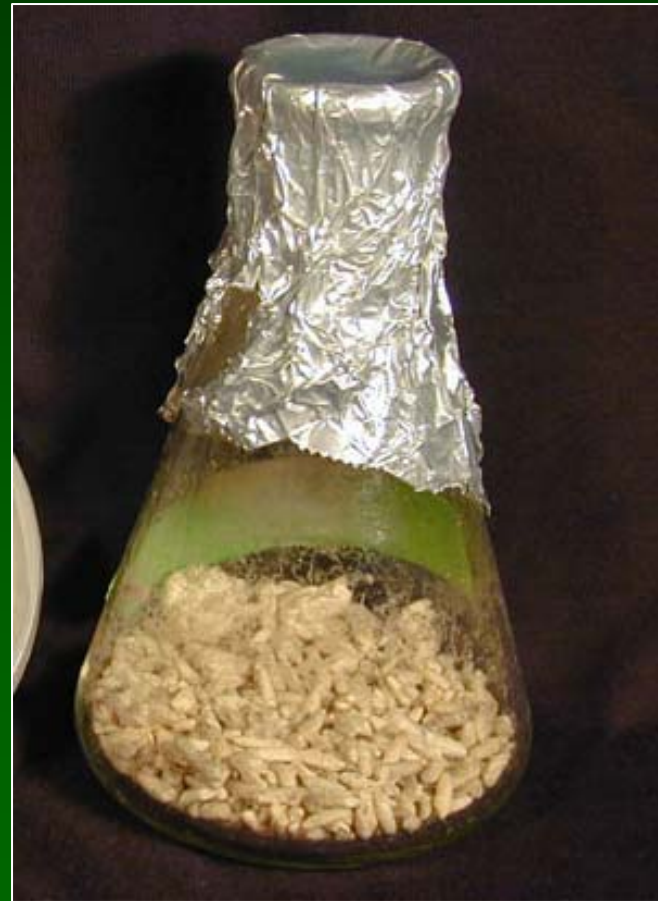
Seed & Cover



Pre-emergence damping-off



Did you notice the rice color change?



Rhizoctonia solani

- *Pythium* and *Thielaviopsis*



Foliar inoculation chamber

- Steve Tjosvold
 - University of California Cooperative Extension, Watsonville



Chamber features



Chamber close-up

- Inoculum
 - Mycelial disk
 - Spore suspension
 - 5,000 zoospores/cap



Chamber in place



A close-up photograph of a plant with numerous green, lanceolate leaves. Several leaves exhibit prominent, irregular brown necrotic spots, characteristic of a fungal or bacterial leaf disease. The spots are concentrated on the upper surfaces of the leaves. The background is a soft-focus blue, suggesting an outdoor field setting.

In the field

Wounding

- More consistent
 - Uniform infection

circular, 6-mm-diameter, fine wire brush



Uses

- Pathogenicity tests
- Fungicide trials
- Environmental studies
- Hosts/cultivar evaluations



Questions?

