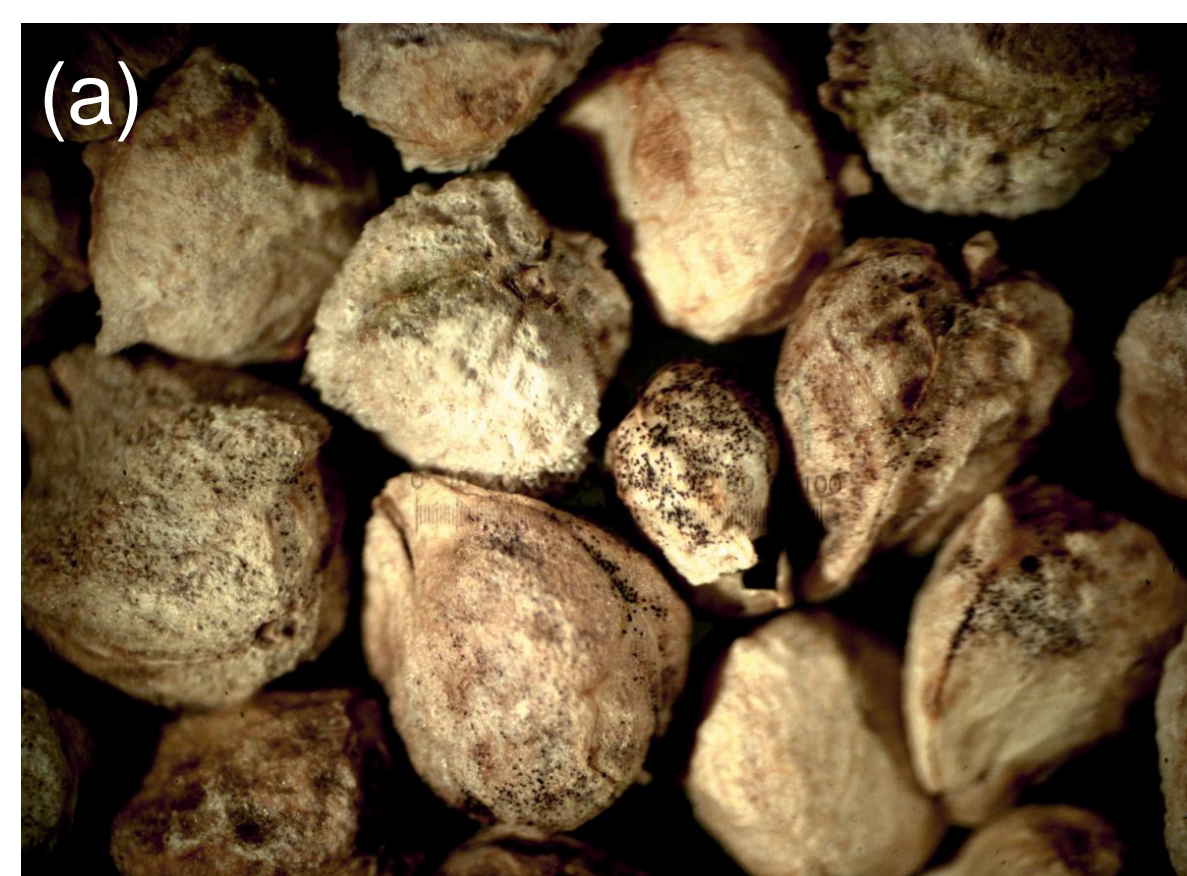


# Conventional Fungicide Treatment Controls Both Conidiophores and Microsclerotia of *Verticillium dahliae*

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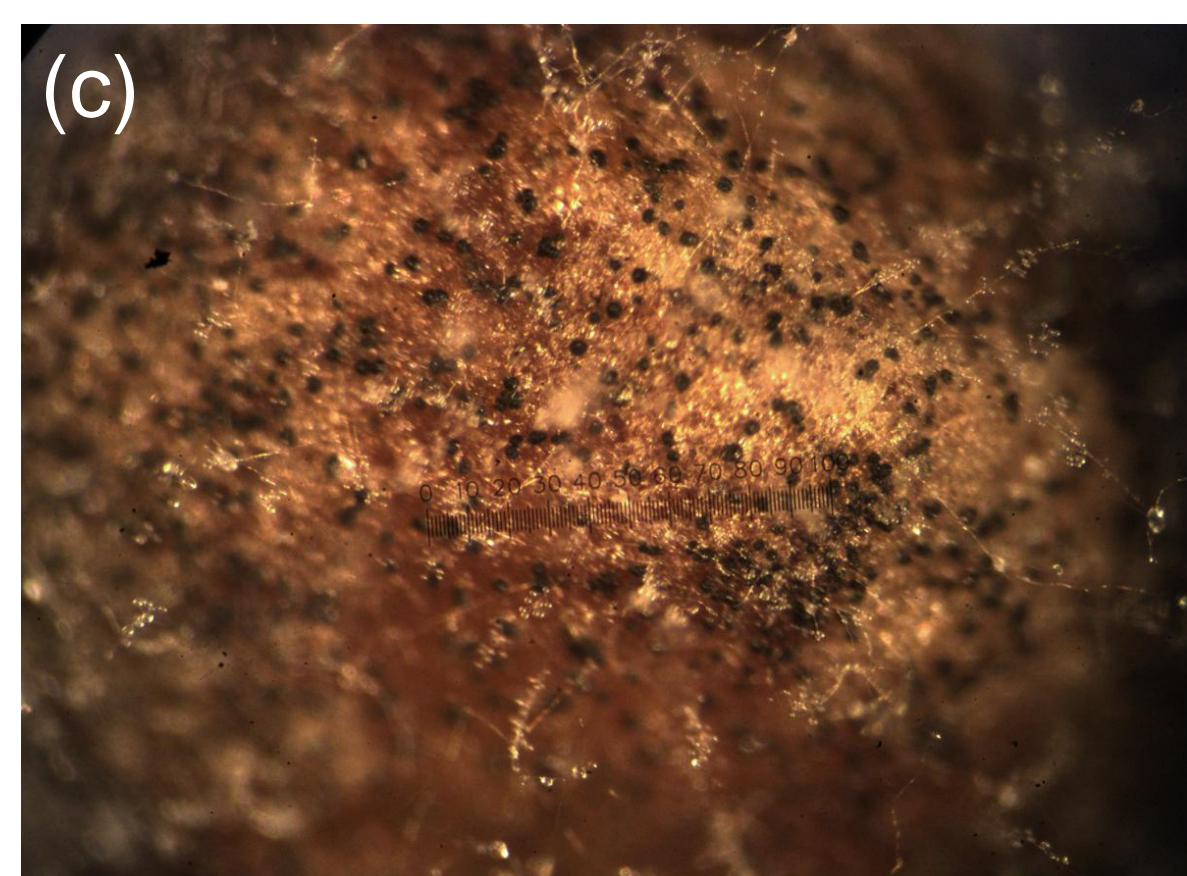
## What are Microsclerotia of *Verticillium dahliae*?



*Verticillium dahliae* is a soil borne pathogen that is highly systemic and is readily seed-transmitted from infected seeds.

Microsclerotia are the resting structures of the fungus that are viable for up to 10 years with report greater than 14 years.

These resting structures are sometimes found on untreated spinach seed lots, and will remain even after treatment even though no conidiophores structures formed on the treated seeds.



Two untreated spinach seed lots with microsclerotia at 15x (a,b)

Untreated spinach seed with verticillate conidiophores and microsclerotia structures of *V. dahliae* after 21 days of incubation at 20x (c)

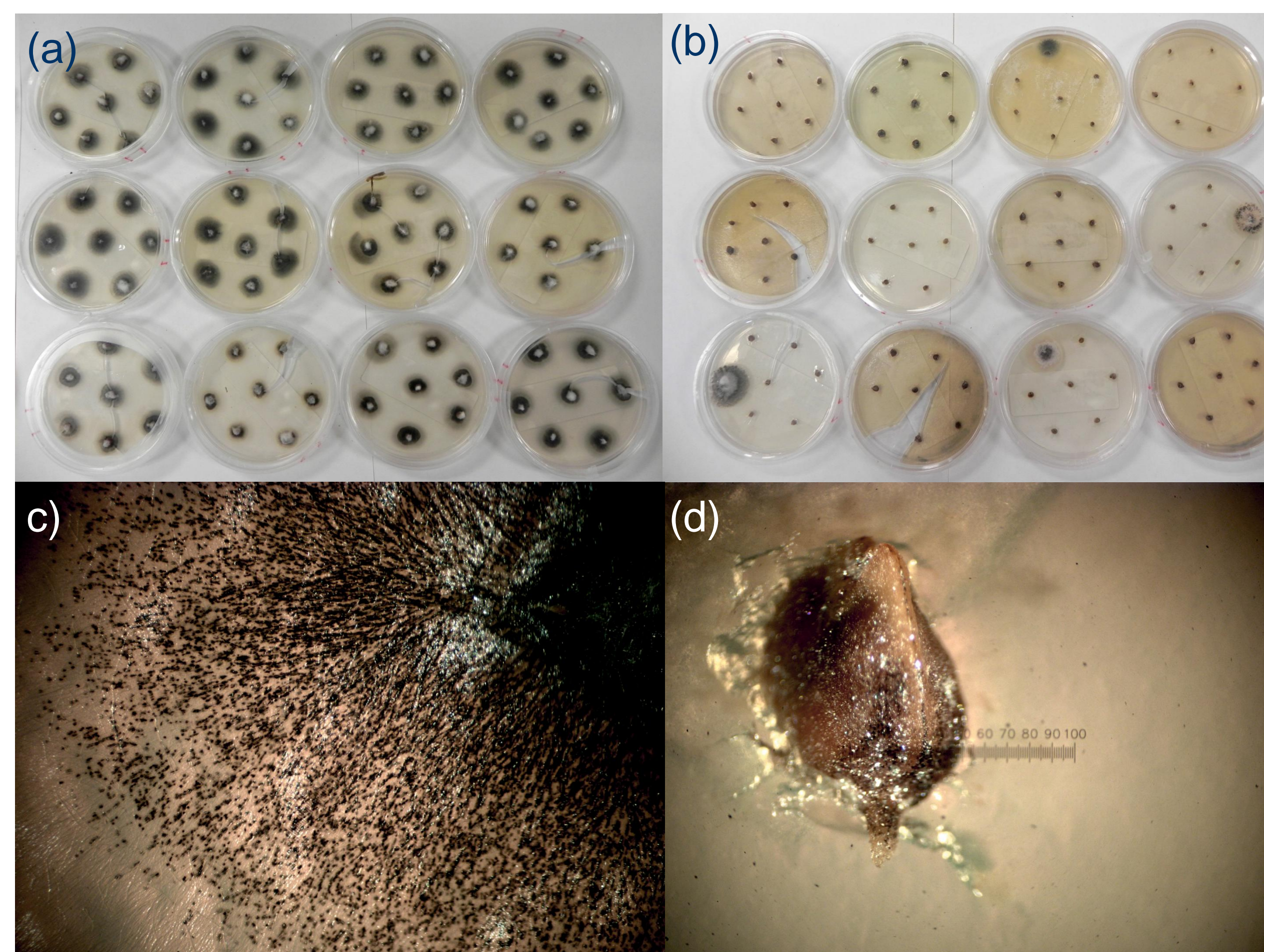
## Are the microsclerotia on the treated seeds viable if you wash off the treatment and incubate it longer?

### Material and Methods

After treatment, percentage of seeds infected with *Verticillium spp.* were determined by seed health diagnostic assays on freeze-blotter and NP-10 following methods developed by Dr. du Toit (Washington State University).

To determine the viability of the microsclerotia left on the seeds. At the end of 21 days of incubation for treated seeds (9 lots), and 14 days for untreated seeds (12 lots). Seeds with microsclerotia were isolated and washed, and the goPure Pro-Gro treatment was removed.

The washed seeds from both treated and untreated were surface sterilized and allowed to air dry before plating onto selective media (NP-10). The plates were then incubated at 26°C in the dark for another 21 days (pictures right) to determine viability of the microsclerotia.



After 21 days of incubation on NP-10, *Verticillium* microsclerotia were viable on untreated seeds (a), close up at 20x (c) show radiating microsclerotia in a banded ring formation that *Verticillium dahliae* forms on NP-10. The microsclerotia on the seeds treated with goPure Pro-Gro were not viable (b), close up at 20x (d) show the treated seed with microsclerotia on the seed

## Conclusion

After goPure Pro-Gro treatment, some spinach seeds were found to have microsclerotia that did not appear to be viable as no conidiophores formed in the seed health assays.

The seeds were isolated, treatment washed off and incubated for another 21 days to determine viability.

Given ideal conditions, the untreated seeds formed conidiophores and more microsclerotia on the NP-10 media. While the microsclerotia on the treated seeds did not form any conidiophores and are believed to be non-viable.

## Reference

du Toit, Derie & Hernandez-Perez (2005). Plant Disease 89(1): 4-110. Updated at the 31<sup>st</sup> March Spinach *Verticillium* Seed Assay Workshop, Davis California  
"Verticillium Dahliae Information Sheet." *Verticillium Wilt (News Release)*. California Seed Association, June 2009. Web.

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## Contacts

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