CULTURAL PRACTICES INFLUENCE PINE FUNGUS

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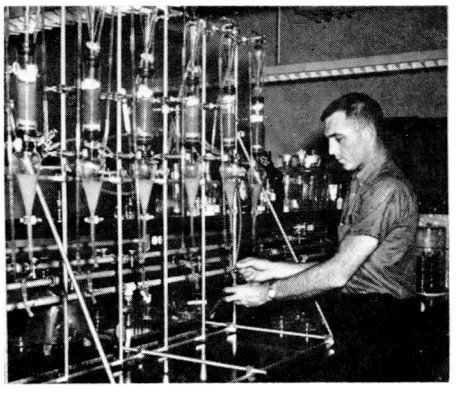


Soil extracts were obtained from glass columns of soil such as these.

In Alabama and the Southeast, the large number of pine plantations established since the advent of the soil-bank program provides an ideal situation for *Fomes annosus* root-rot to become widespread, particularly following thinning operations. Because this fungus also attacks pine seedlings, replanting of clearcut *F. annosus*-infested plantations could result in considerable seedling loss. This would mean added expense to the landowner because he would have to replace the dead seedlings.

It is known that air-borne spores of *F. annosus* germinate on stump surfaces and establish a source of infection for adjacent trees. However, the ability of the fungus to become established in forest litter and soil has not been clarified. Basic information on soil conditions unfavorable for growth or survival of the pathogen may indicate ways of intensifying the suppressive effects and suggest control measures.

The Auburn University Agricultural Experiment Station established a test in a *Fomes*-infected clearcut pine plantation provided by the International Paper Company, Bainbridge, Georgia. Five plots were prepared to create different soil environmental conditions. The treatments were: burned; burned and disked; and burned, disked, and seeded (one plot each) with lupine, oats, or rye. A sixth plot adjacent to the others, and with unmolested natural stand, served as a control.

Beginning 4 months after the plots were established, samples of organic debris and soil were collected at 4-month intervals from each treatment. They were processed or tested in the laboratory by standard and special techniques to determine colonization of organic matter by *F. annosus* or other fungi; soil fungistasis (inhibitory effect of soil on spore germination); microbial populations in the soil and the percentage of these organisms that inhibit growth of *F. annosus;* and effect of filter-sterilized leachates of the soil on growth and spore germination of the parasite on a culture medium. The leachates (water extracts) were obtained by automatically cycling water through glass columns of plot soils after 14 days of incubation.

Soil Fungistasis Results—Germination of Spores on Soil Collected in April

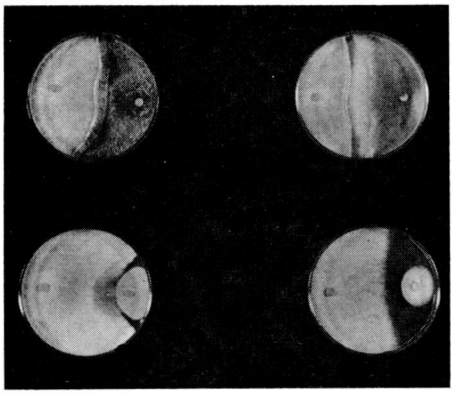
Plot	Germination	
	Sterilized soil	Non-sterilized soil
	Pct.	*Pct.*
Natural	99.3	4.3
Oats	4.2	0.0
Rye	3.6	1.0
Lupine	97.1	1.6
Burn	87.9	0.0
Burn and disk	95.3	0.3

Predominant fungi colonizing organic debris particles were species of *Trichoderma, Penicillium, Aspergillus,* and *Gliocladium.* Failure to find *Fomes* colonizing debris particles anytime during the study may reflect the fact that species of each of the most prevalent fungi are known inhibitors of *F. annosus.*

In the fungistasis tests, spores of *Fomes* did not germinate on non-sterilized soil taken from the plots in January or August, but some germination occurred on the soil taken in April. Germination on the oats plot was totally inhibited and germination on the natural check plot was least inhibited. Spores germinated readily on all soil samples when the soil was sterilized, except those from the oats and rye plots in April. Definite inhibition was observed on these.

Soil microbial populations varied with the sampling date. The highest percentage of antagonistic organisms was normally associated with the oats and rye plots, suggesting some correlation with fungistasis results on non-sterilized soil. Growth of the pathogen was inhibited on agar containing soil extracts from the burned plot and the lupine plot in January, but there was little difference between plots on other sampling dates.

The identity of the spore-inhibiting factor(s) in soil from the oat and rye plots is not known at this time, but probably is a combination of antibiotic effect and absence of required nutritional components for germination. Other research workers also have found beneficial effects of oat culture and oat residues in soil for suppressing the activity of soil-borne plant parasitic fungi.



Examples of soil fungi (right side of plates) exhibiting antagonism to F. annosus.