Stimulation of Oleoresin Flow in Pines by a Fungus

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A species of *Fusarium* has recently been found which causes very pitchy cankers on young branches and stems of Virginia pine (*Pinus virginiana* Mill.) and, to a much lesser extent, on those of shortleaf and pitch pines (*P. echinata* Mill. and *P. rigida* Mill.) in the Carolinas (*1*). A few attacks have been noted on the larger trunks of some Virginia pines, and while these trunk attacks have been less severe than those on younger shoots, copious and long-continued gum flow occurred. It seemed conceivable that, since this *Fusarium* so stimulated the flow of oleoresin, it might have application in the naval stores industry, provided the trees are not killed or seriously damaged by the inoculation, provided the widespread use of this organism results in no other unforeseen dangers, and provided the method has commercial advantages. Some preliminary tests have therefore been made of the effect on gum flow of the application to wounds of spore suspensions and filtrates of solutions upon which the fungus grew.

In June 1945, the *Fusarium* was grown on Tochinai liquid medium for a few weeks. The medium was then run through filter paper, which removed the larger mycelial masses but not the spores. One lot of this spore suspension was boiled and one was not. Twelve Virginia pines were then gouged on two sides, in the manner of turpentining streaks, one streak on each tree remaining untreated. The unboiled suspension was added to one streak on each of 8 trees, and the boiled to one streak on each of 4 other trees. During the next year and a half, a continuous pitch flow exuded from the streaks receiving unboiled suspensions, and very little flow, of short duration, exuded from the wounds receiving the boiled suspensions and from those receiving no application.

The 1945 liquid cultures were kept until 1946. On August 6 the cultures were run through filter paper, half of this filtrate then being run through a Jenkins porcelain filter. The following day these solutions were applied to punch holes made through the bark and just to the wood surface of the trunks of four Virginia pines, 7.4–8.2 inches in diameter, breast high; four shortleaf pines, 6.7–8.4 inches; and two longleaf pines, 6.2–6.4 inches, growing on the Bent Creek Experimental Forest near Asheville. Five holes were punched spirally around each tree, the lowest at 1 foot above ground, and the highest at 6 feet. The holes were made with a steel punch, $\frac{7}{8}$ inch in diameter. Small metal aprons were placed under the holes and glass vials under the aprons, to catch the gum, after a method devised by Ostrom and True (*2*). Culture solutions containing active spores were brushed into two of the holes on each tree, culture solutions sterilized by passage through porcelain filters were brushed into two other holes, and the remaining hole on each tree was untreated. The order of treatment was randomized on each tree.

[1]E. R. Roth, Division of Forest Pathology, assisted in the field work, facilities for which were made available through the cooperation of the Southeastern Forest Experiment Station, Asheville.

Fig. 1 shows gum yields for the different species and treatments between August 6 and October 19. All untreated holes and those treated with porcelain-filtered culture solution showed a small initial gum yield during the first few days, after which the flow ceased. The holes treated with solutions containing viable spores have shown marked stimulation of

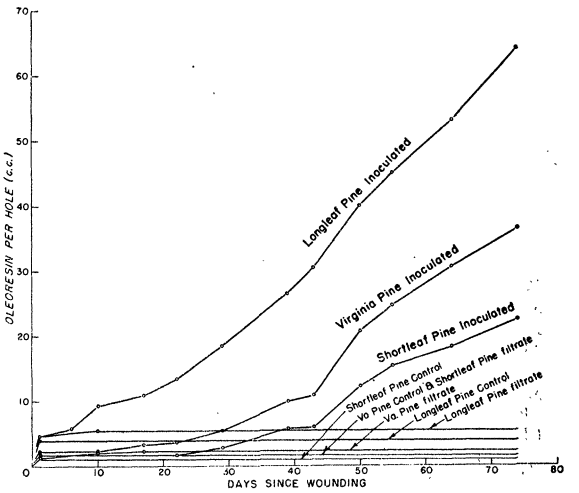

FIG. 1. Mean cumulative volumes of oleoresin produced from untreated holes, from holes receiving sterile culture filtrate, and from holes receiving application of *Fusarium* spores.

gum flow, particularly in longleaf pine. Average gum production for the two inoculated holes on one of the longleaf pines was 120 cc. per hole over the 74-day period. The untreated holes on this tree yielded 4 cc. each.

The advantages of any such method of gum stimulation, giving high yields and providing a continuous gum flow without need of repeated chipping, are obvious. Gum stimulation by the pitch canker *Fusarium* will be investigated further to determine the ultimate effect of inoculation on the trees, the effect on gum yield over a period of years, and the many other factors connected with the possible use of this fungus in turpentining operations.

References

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Electrometric Studies in Women With Malignancy of Cervix Uteri

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A study is being made of the relatively steady state voltage gradient between the symphysis pubis and the cervix uteri in women with malignant and nonmalignant disease of the genital tract. A microvoltmeter, a recording galvanometer,