USE OF GEOTECH AT THE JSC/CCA ROCK CREEK NURSERY

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ABSTRACT

Geotech soil stabilizer is a product that can be used to reduce seed and seedling loss in southern pine nurseries due to soil erosion. It is currently being used operationally at the CCA Rock Creek Nursery. The extent of use. application methods. and the results of the use of Geotech are described.

I NTRODUCTION

The loss of seedlings due to seed bed soil erosion following heavy spring rains has always been a problem in southern nurseries. Seed bed mulches of different types have been used for many years to help prevent this erosion as well as to reduce soil moisture evaporation. In recent years, Geotech EA-11044, a product of Borden Chemical. has been used in nurseries to help stabilize the seedling beds through the critical period shortly after sowing.

Geotech is a copolymer resin that is diluted in water and applied to the seed bed. It then cures into an invisible film which forms a crust with the soil surface. This crust holds the soil particles in place and prevents them from being eroded. Geotech's storage life i n a container is three months at 70 degrees Fahrenheit. When applied on the seed bed. it will eventually break down into a nitrogen compound.

The cost of using Geotech is estimated to be between 10 and 25 cents per thousand seedlings for the material only, depending upon application rate. cost of materials. and seedling density. This cost must be compared against each nursery's expense of lost seedlings, and the cost of alternative mulches.

Geotech was used at the JSC/CCA Rock Creek Nursery for the first time in 1986 on an experimental basis. We began use of Geotech operationally on 100% of the seedling beds in 1988. Modification of equipment was necessary for application and two application rates and methods were used.

GEOTECH APPLICATION

To conserve Geotech, the majority of the Geotech was applied on the shoulders of the seed bed where erosion had been the most problem i n the past. The shoulder of the seed bed is where erosion starts

and by stopping erosion there, soil and seed loss over the entire bed could be reduced. Geotech was applied on top of the beds in conjunction with the shoulders of the beds on approximately 40% of the nursery and on the shoulders only on the remaining 60% of the beds.

Before the nursery seed beds were sprayed with Geotech, irrigation was applied for twenty to forty minutes, depending on the soil moisture content at the time of planting, and in an effort to determine the best amount of soil moisture for Geotech penetration into the soil. Some areas were also irrigated after the Geotech was applied in an attempt to increase the Geotech's soil penetration.

Two Geotech to water rations were used, (1:14.5)and (1:11.4). Both were mixed directly in a modified Finn Hydro Mulcher and were mixed without any defoamer. The factory mechanical agitator was removed from the Hydro Mulcher's tank when the Geotech sprayer was being built. There *was* no problem with foaming as long as the Geotech was added after the tank had been filled with water.

The Geotech sprayer was pulled and powered by a John Deere 2950 *1000* RPM PTO tractor at two miles per hour. The use of the tractor's PTO to power the sprayer eliminated the use of an engine on the Geotech Sprayer.

We designed our Geotech Sprayer to cover three seed beds at a time. using a two boom system. The first of the two booms was mounted approximately 12 inches from the top of the seed bed, and was fitted with 6 Tee Jet *8020* nozzle tips, two per bed. (See Figure #1) Each of these tips was mounted on Tee Jet swivel nozzles. This was done so that the spray pattern could be directed perpendicular to the sloping shoulder of the seed bed. By spraying perpendicular to the seed bed shoulder. rather than perpendicular to the ground, a better spray pattern and shoulder coverage could be achieved.

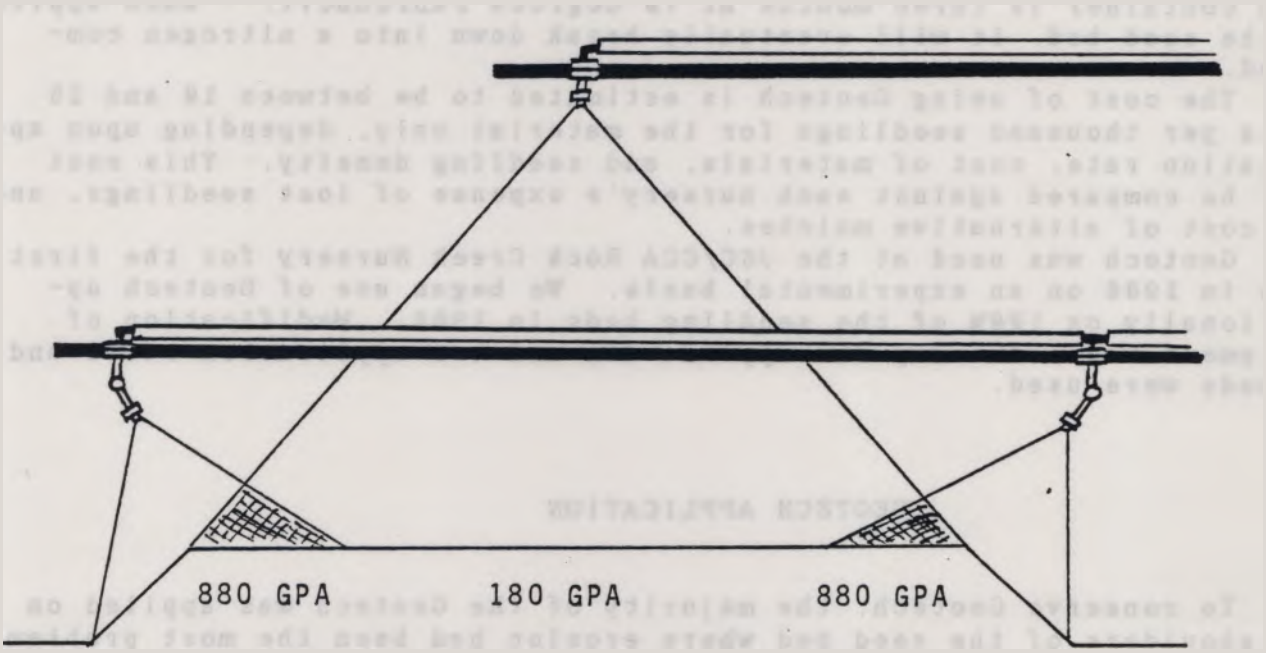

FIGURE #1

The second boom on the Geotech Sprayer was mounted approximately 28 inches from the top of the seed bed, and was fitted with three Tee Jet *11020* nozzle tips, one per bed. (See Figure #1) These nozzles tips spray at an 110 degree angle and when mounted at this height, will spray approximately 50 inches wide, or the entire top of the seed bed.

All the nozzle tips used on the Geotech sprayer will spray 20 gallons per minute at 40 psi, although the Geotech sprayer achieved much higher pressures than this. By mounting these nozzle tips in this arrangement, they applied the Geotech at different gallonages per acre based on the surface area they covered. The *8020* nozzle tips used on the bed shoulders will applied approximated *700* gallons per acre. while the 11020 nozzle tips used on the top of the beds applied only 180 gallons per acre. The highest rate of Geotech, 880 gallons per acre. was applied on the outside six inches of the top of the seed bed where the two spray patterns overlap. (See Figure #1)

Sawdust was applied as a mulch after the Geotech application on the long leaf pine beds. No mulch of any kind was used on the loblolly or slash pine beds.

CONCLUSION

Both of the Geotech rates used worked well, but the higher of the two rates I 1:11.4), appears to have stabilized the seed bed shoulders better than the lower rate (1:14.5). The beds that were sprayed only on the shoulders are in good condition in July. although the recent numerous heavy rains have began to deteriorate the Geotech and erode the seed bed shoulders. The beds that were sprayed on the shoulders and also on top of the beds are also in good condition. It is difficult to see any differences but those beds sprayed on the top of the beds appear to have slightly less sand splash.

We found that to achieve the best soil penetration by Geotech. the soil needed to be saturated with moisture. The beds that had been irrigated for forty minutes as opposed to twenty minutes appear to have better Geotech penetration and soil stabilization. No improvement in Geotech soil penetration could be seen by irrigating after the Geotech application.

We also found that by coating the Geotech sprayer with a mixture oil and diesel fuel (1:4) before the application of Geotech began. the dry Geotech residue on the sprayer could be removed easily with one steam cleaning.