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At Saratoga, our seeding is done with a Brillion seeder modified to band fertilizer below and a little to one side of the tree seed drill. This machine sows into the soil so that no additional sand and sawdust covering is necessary. The corrugated surface left by the machine, while quite resistant to erosion, needs some over-winter protection on fall-sown beds. The mulch used at Saratoga has as its primary function erosion control, rather than moisture control. The somewhat deeper than usual sowing at the top of a 2 inch wide ridge has maintained control of moisture quite well.

On fall-sown beds to be shaded in the spring, a lath rack or Saran shade is placed on the ground for the winter and raised to provide shade during germination. On fall-sown beds to be unshaded in the spring we have for several years used burlap. This must be removed as soon as germination begins in the spring and is, therefore, not of any help to bring on slow-germinating seed. This system costs about \$150.00 per acre, more if the wind is blowing during the operation or if the burlap is wet at the time it is removed.

Trials at Saratoga and the experience of Clifford at Chittenden Nursery have shown that Turfiber, a wood pulp product of International Paper Co., will do a good job at a cost of around \$90.00 per

acre. Turfiber is applied with a hydro-mulcher at the rate of about 1,000 pounds per acre in 3,000 gallons of water. The machine costs about \$5500 for a 1500 gallon model and a wagon to carry it. Smaller models are available, We propose to use a high boom carrying nozzles of the flooding or field jet type made by Spraying Systems Co. The coarse flat spray will be directed downward. The mulch in place resembles a sheet of green blotter paper. One of the advantages of Turfiber is that its benefits extend beyond the germination period.

Turfiber may be used for spring seedlings, but a lower cost mulch is the emulsion type already described by Pat Lantz. The choice might depend on whether or not the beds are to be shaded and whether the seed is a slow or fast germinator. Depending on the required amount, 12 to 33 gallons per acre of emulsion made up to 200 gallons with water might be used. The cost will then run from about \$30.00 to \$65000 per acre. An advantage of the emulsion is that only ordinary spray rigs are required for application. Immediate and thorough washing of the rig when the day's job is done is suggested.

All costs mentioned are costs in place, They include material and labor. In the case of Turfiber, a depreciation cost is included because of the expensive application machinery.

The winter mulch is wood chips (made from red and white pine plantation thinnings) or bark from a mechanical log debarker. The bark is a very stable material requiring no additional help to keep it in place. Wood chips made during the winter from frozen wood fracture into little pieces slightly larger than coarse sawdust. Wind drifting of these fractured chips is still a problem. To help solve it, we have made a seeder to sow oats between the drills in September. The oats provide a windbreak and the stems stop the blowing of mulch. The oats will remain green until late in November.