

of Methyl bromide per 100 sq. ft. of soil. Exposure should be for 24 to 48 hours. Aeration for methyl bromide is 48 to 72 hours; after that time it is usually safe to complete grading and plant. Most fumigation of golf greens is done in this manner.

Manual Tarping Method

(2) Chisel injection manual tarping method: Due to the volatile nature of these fumigants, chisel injection can create some unique problems. Rapid expansion to the gaseous state causes icing of injection tools. This is overcome by dilutions and mixtures with other chemicals which slow down the diffusion of the gases. In order to accurately calibrate dosage, it is essential that three factors be held constant. These are: speed of the delivering carrier, spacing on the injection chisels, and weight or viscosity of the mixture. With these factors held constant, various orifice plates can be used at given pressures to maintain very accurate calibration.

When these chemicals are injected into the soil at a depth of 6 to 8 inches they are found to create semi-oval, linear plane diffusion patterns which overlap at 10 to 14 inch chisel spacings. Penetration of the chemical is enhanced and results are achieved at lower dosages.

Application Method

Application equipment which embraces all the above features is in daily commercial use and greatly increases the speed and economy of application in comparison with the so-called raised tarp method, already described. The fumigant is injected into the soil through nine chisels spaced 12 inches apart. Mounted on the same tool bar is a disc which opens a trench on the outside of the area to be treated. By making a second pass in the opposite direction an 18-foot area is thus treated with a trench opened on each side.

Immediately after application a 2 mil polyethylene tarp, 20 feet wide is rolled over the treated area. The edges of the tarp are placed in the trench in a vertical manner and the trench is filled in. A complete seal is effected. No appreciable fumigant is lost as the area is covered and sealed within 30 minutes.

An experienced crew can apply and cover three to four tarps, 800 feet long, in one hour. The following day the area adjacent to the tarp is treated in the same manner, the only exception being that only

one trench is opened at the outer edge of the newly treated area. The tarp that was layed the previous day is flopped over this area and sealed. If treatment is desired in two days, tarps should be spaced at 36 foot intervals so that the first tarp when flopped meets the area covered with the second tarp, and so on. The tarp can then be moved to the next area to be treated. In general, a 2 mil tarp will hold up through six to ten flops before it must be replaced.

Automatic Tarping

(3) Chisel injection automatic tarping: The theory of application is the same here as in the previous method except that a rather recently perfected machine attached to the tool bar is used to lay the tarp automatically as the chemical is injected. With this machine we treat a 9 foot, 6 inch swath, covering with 11 foot wide 1 mil poly film. The fumigant is injected, the trenches opened, the tarp laid and the edges buried in one operation. This is the ultimate for a large scale operation.

The factors governing which method should be used are time, available labor and area to be treated. In the preparation of a golf course, if only greens are to be treated and weeds are to be controlled, we recommend the "raised tarp method". Polyethylene film can be obtained in widths up to 40 feet and 100 feet long, permitting covering of a large area at one time. In this way, the soil can be prepared for seeding before fumigation and requires a minimum of work to smooth out footprints and other irregularities when the tarp is removed. Use of tractor equipment on greens presents a problem of compaction.

If fungus diseases are known or suspected to exist, chloropicrin can be very easily and effectively applied in areas such as golf greens with a hand operated applicator known as the Fumigun. Experience has shown that no golf green should be established without the use of fumigants in the soil preparation.

Michigan State Field Day

Michigan State U's turf field day is scheduled for June 25 at the University farm in East Lansing. James B. Beard, assistant professor in the farm corps dept., is in charge of arrangements.

Golf Guide is a 92 page booklet to be published this month by Snibbe, Mott & Assoc., New York 1.