Tell Use and Effect of Downfume MC-2 in **Turf Renovation**

ONE of the new effective soil fumigants to be introduced to the turf market in recent years is Dowfume MC-2 (methyl bromide with 2 per cent chloropicrin, a warning agent) developed by Dow Chemical Co., Midland, Mich.

Several years in the development stage, the fumigant is designed for application under gasproof cover for treatment of plant beds and other local areas. It is capable of killing most weed seeds, quackgrass, nutgrass, rhizomes, stolons, tubers and other vegetative plant organs as well as nematodes and soil insects, if properly applied. It is equally effective in turf renovation or as a preplanting agent for newly prepared soil or undisturbed sod. More and more golf course supts. are endorsing the use of this soil sterilant.

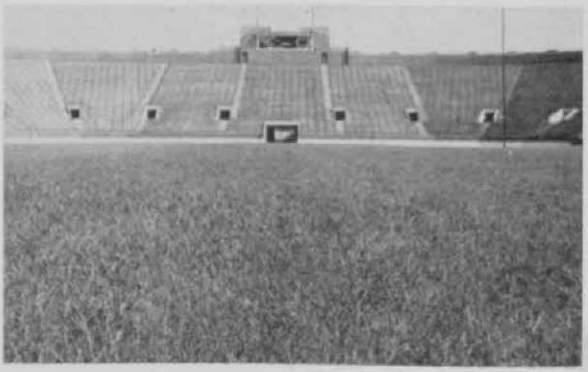
Rather elaborate measures have to be taken in applying MC-2 since it is a poisonous gas. But wide areas can be covered in a single application of the fumigant through the use of economical polyethylene covers that may range anywhere from 1600 to 8000 sq. ft. in area, and which can be conviently moved from one plot to another. Exposure time for MC-2 is from 24 to 48 hours depending on the temperature and condition of the soil being treated.

Dowfume can be dispersed from 1-lb. applicator cans or from large cylinders. It is applied only under gastight cover. Saran or polyethylene tubing carries the fumigant from the applicators or cylinders to evaporators spotted about 30 ft. apart in the area to be treated. When the applicator is punctured or the fumigant released from the cylinder, the gaseous methyl bromide passes through the tubing to the evaporators where it volatilizes and is dispersed over the area under treatment. Tin pans, pieces of eaves troughs or plastic containers are usually used as evaporators.

Two Methods of Laying Cover

When large areas such as golf courses or athletic fields are treated with MC-2, two methods of laying the polyethylene blanket can be used. One is to anchor the cover in two narrow parallel trenches separated by the approximate width of the cover (usually 16 to 20 ft.). The edges of the cover are battened down with soil or sod. To insure thorough circulation of the gas, the cover is kept 10 or 15-in above ground by straw-filled grain bags or cotton woven pillows placed at about 10-ft. intervals.

More recently, an improved method of laying the polyethylene blanket has been adopted. Six-inch, 20-gauge galvanized sheet iron strips are placed in the soil to a depth of about 3-ins. Butt joints are taped with masking tape. When the cover is drawn over the area to be treated, care is taken to remove all wrinkles so the gas won't have a chance to escape. "S" cleats, up to 6-ft. or more in length, which can be purchased from sheet metal fabricators, are used to clamp the polyethylene cover to the galvanized strips. Covers may be used for as many as a dozen applications of MC-2 if carefully handled and stored.



Notre Dame University's stadium was Dowfumed early in April. Three weeks later a mixture of Merion and Kentucky bluegrass was planted. This is how the turf looked on July 28.

Dowfume MC-2, quick vaporizing liquid, is introduced under polyethylene cover buoyed by cotton pillows (note waves) so gas will circulate. About 24 to 48 hours' exposure will kill weeds, weed seeds, grasses, nematodes and some plant diseases. After 24 hours aeration, area may be planted to seed, plugs, sprigs or stolons.

First step in treating an area with Dowfume MC-2 is to provide evaporating basins, cover supports and cover seal. The seal consisting of long metal strips, S cleats and spring hooks is applied above.

Where fairway grass encroaches on greens, the area can be killed to give a fresh start to newly planted grass without disturbing the dead sod. MC-2 was applied to this green at Midland, Mich. GC under plastic cover whose outline is indicated by light strip. New grass will quickly appear through dead sod.

Minimum exposure period is 24 hours. If soil temperature is below 60 deg. F it is recommended that the fumigant be allowed to remain over the treated area for 48 hours. If the soil has not been worked up, MC-2 will normally penetrate to a depth of 2 or 3-ins. In aerified areas where cores of soil have been removed it will penetrate to 5-6 ins. Tests have shown that under average conditions the fumigant will kill insects burrowed as deep as 10 or 12-ins. and nematodes to a depth of about 6-ins. Dry soil does not produce favorable results. The ground to be treated should be drenched and kept moist for three or four days prior to application of the gas. Wetting the soil immediately before treatment has not proved to be satisfactory. One pound of MC-2 is normally recommended for treating 100 sq. ft. of turf or soil.

Use of MC-2 in Renovating Turf

The success of any treatment for establishing new turf requires good cultural practices. Sand and organic matter should be mixed into heavy clay or silt soil and sufficient fertilizer and lime should be added to properly prepare the soil for good grass growth. If the soil texture is satisfactory fertilizer and lime may be added in the winter or fall preceding spring treatment. Treatments made in early fall can be followed by fertilizer and lime applications if accompanied by sufficient rainfall or irrigation. Grass seed can be planted 48 to 72 hours after fumigation.

In newly prepared soil, preplanting treatments of MC-2 is effective in controlling vegetation which might compete with grass seedlings. Here moisture content of the soil plays an important part because hard coated seeds of certain plants are not destroyed by the fumigant unless they are quite moist and have begun to germinate. Fumigation of newly prepared soil is or can be especially effective since MC-2 penetrates best in cultivated areas.

Where old turf is to be renovated without cultivation, the area should be fertilized and watered after the polyethylene cover is removed. Seeding then can take place 24 to 48 hours after fumigation when dormant seed is used or from 48 to 72 hours when pregerminated seed or stolons are planted. Thorough watering after seeding is necessary in order to wash away dead vegetation which otherwise may prevent the seed from making contact with the soil. If more than average penetration of the gas into old turf is desired to effectively control nutgrass, nematodes and soil borne

insects, Dow technicians suggest aeration of the area prior to treatment.

Passing over the area with a shallow spiker after fumigation prepares an excellent seedbed. Tests conducted by Dr. W. H. Daniel at Purdue showed that spiking both before and after seeding greatly improved grass stand.

Precautions Suggested

Until more is known about some of the problems related to MC-2, the Dow company recommends caution in completely fumigating in close proximity to shallow rooted plants growing in light soil. Some protection may be afforded these plants by thoroughly irrigating the area where roots are located prior to treatment. Red cedar, Swedish and Pfitzer junipers growing in light sandy soil have been damaged by MC-2, but where treatments have been made to within two feet of shrubs, no ill effects have been noted. Large areas under old black locust, maple and apple trees have been treated without the trees having been damaged.

MC-2 also is highly toxic to warm-blooded animals and people. Only persons familiar with the safe uses of gases and vaporizing liquids are qualified to use it. This would include greenkeepers, gardeners and greenhouse operators, many of whom are well enough acquainted with fumigants similar to MC-2 to safely apply it after studying methods recommended by the Dow's company technical staff.

There are several advantages to treating undisturbed sod for turf renewal. In many cases, such as around golf greens, it is possible to allow traffic to continue over the new grass seeding. This is due to the protecting effect of the old grass and roots which hold the soil together and protect the new grass seedlings until they become established. The old grass acts as a mulch to maintain a moist seedbed and the decaying roots from old sod aid in aeration of the soil, favoring good grass growth.

A typical example of the fine results obtained with MC-2 is the Notre Dame University football field. Dissatisfied with its condition in 1954, Supt. Chester Keeley decided to renovate the field for the 1955 season. The entire area was cultivated and organic matter and sand added before the fumigant was applied. On Apr. 29th of last year, the field was seeded with Merion and Kentucky bluegrass. First mowing came 34 days later. The grass was mowed twice a week for five weeks and then three times a week for ten weeks therafter. By this time the grass roots had grown to a depth of 9-in. and was entirely free of undesirable grasses and weeds and new turf had developed uniformly. In Keeley's estimation, the turf held up amazingly well throughout the entire football season, probably better than it had at any time during his 25-year tenure at the South Bend school.

Turf authorities who have carried on extensive experiments with Dowfume MC-2 and aided in its development include Dr. W. C. Elder of Oklahoma University and Dr. W. H. Daniel of Purdue.

Used in Nursery

William E. Lyons, supt. of Firestone GC, Akron, O., and owner of a turf grass farm, also has done some interesting work with the Dow product. Lyons first used MC-2 to kill quackgrass in a home vegetable garden. Later he reclaimed a 5-acre tract of muckland for a turf nursery, successfully growing Pennlu, Meyer Zoysia, Z-73, Hall's U-3 Bermuda and even Tifton 127 Bermuda after fumigating the area.

Planting of the grasses was started 24 hours after the cover had been removed. "We were well pleased and a little amazed at the rapid rate of growth," says Lyons. "Dowfuming enabled us to plant continuously from June 1 to Aug. 1. Even stolons planted in August in 3-ft. rows covered the ground in short time and were sold late in the fall."

Lyons annually Dowfumes his nursery before planting a new grass crop since it eliminates old sods from regrowing unwanted seedheads. According to the Akron turfman's observations, only clover and buckhorn plantain are impervious to MC-2, and require hand weeding. Lyons has built portable covers for convenience in fumigating his nursery. They are made of 1x3-in. spruce strips, 14-ft. long and 7-ft. wide with 12-in. ridge poles in the center to keep the covers off the ground and enable the gas to circulate underneath them. A one-pound can of Dowfume is just right to fumigate the 98-sq. ft. area under each cover. After one plot is fumigated, Lyons' portable cover can be easily dragged to a new location.

Iowa Short Course

Iowa GCSA will hold its annual turfgrass short course at Iowa State University's Memorial Union, Ames, Mar. 12-14. Dr. O. J. Noer and Dr. William Daniel will be the principal speakers.