

Workers used 32-foot wide tarps in this soil fumigation job. Tarp edges are sealed with soil to keep gas in.

## How to Fumigate Soil for Turf Weed Control

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**T**HANKS to chemical research, contract applicators have at their disposal the means to produce thick, healthy turf, in double-quick time. From research laboratories have come powerful soil fumigants which, by virtue of their lethal action against weeds and other soil pests, are highly effective aids in growing new turf or renovating old.

Turf is, of course, best known in home lawns, golf greens, football playing fields, parks, and other mowed areas. Grass varieties have been developed which stand a great deal of traffic. Some of these are adapted to shade, some to sunlight; some to acid and some to sweet soil; some to drouthy conditions; some are adapted to specific areas of the country.

Whatever kind of turf may be established and under whatever conditions, certain soil pest problems are present to beset the custom sprayer, nurseryman, gardener, or maintenance man charged with the responsibility for upkeep.

One such problem is the competition from early weeds. Most desirable grasses are fairly slow to start from seed. Before they have a chance to grow strong and dense, weeds of many kinds usually become very thick and troublesome. They may include weed grasses such as Johnsongrass, quackgrass, and crabgrass.

### "Nurse Grasses" May Bring Weeds

It is frequently desirable to renovate turf areas that have become infested with undesirable perennial grasses. Such grasses

may grow up in turf from poor seed, or they may occur naturally in the soil. And they may be included in seed mixtures as nurse grasses, which are usually fast-growing. Purpose of these nurse grasses is to prevent erosion, protect the tiny seedlings of desirable grass, and provide a surface which withstands limited traffic while desirable grasses of slower growth are coming along. Experts have long recognized, however, that nurse grasses offer stiff competition to permanent grasses, and, according to some, their value is questionable.

Underground insects and nematodes are serious parasites of desirable turf grasses. Nematodes — destructive, microscopic worms in the soil — often make it impossible to produce good turf unless they are controlled. White grubs, wireworms and many other soil insects, as well as soil-borne diseases, also attack grass roots.

This formidable array of pests — weeds, weed roots, weed seeds, nematodes, wireworms, grubs and plant diseases — all are controlled by the potent chemical action of soil fumigants.

These pest-control materials are not exactly new to agriculture,

although some of them have been vastly improved as a result of years of chemical research. Several of the newer materials, Trizone and Brozone soil fumigants manufactured by the Dow Chemical Company and Pathofume (B) and Weedfume manufactured by the Neil A. Maclean Company, two of the pioneers in this field, have proved effective in treating seed and plant beds and in the culture of nursery ornamentals. These two materials, in addition to Dowfume MC-2 soil fumigant, another Dow product, are tools to fight the perennial battle against soil pests in the production of new turf or renovation of old.

Elaborate mechanical procedures have to be followed in applying each of these fumigants, since all are poisonous gases. Their application must be carried out by qualified, competent operators following the manufacturer's use recommendations explicitly. Soil fumigation is not the kind of a project the eager, do-it-yourself home gardener can take on over a weekend. This means more business for contract applicators.

Dowfume MC-2, consisting of 98% methyl bromide, with 2% chloropicrin added as a warning agent, is used on small turf areas, around homes, for example. Trizone, Brozone, Pathofume (B) and Weedfume are more suitable

Information in this article concerning products of the Neil A. Maclean Company was furnished by Norman Ehmann, Maclean vice president, Belmont, California. Ed.



for application to large turf areas such as parks, athletic fields, and turf nurseries. Trizone fumigant is a blend of three fumigants — 61% methyl bromide, 31% chloropicrin and 8% propargyl bromide. Brozone is a mixture of 70% Dowfume MC-2 and 30% oil as a carrier. Pathofume (B) is a blend of 67% methyl bromide and 33% chloropicrin. Weedfume is a mixture of 70% methyl bromide and 30% petroleum thinner as a carrier.

#### Preplant Treatment with Dowfume

In the preplant treatment of soil with Dowfume MC-2, the gas, at 1 lb. per 100 sq. ft., is released as a vapor under a gas-tight tarp such as polyethylene film sealed to the earth all the way around the edges.

This requires precise operation in order to obtain a satisfactory seal and necessary gaseous distribution of the vaporizing material. The pressurized fumigant is released by applicators such as the one made expressly for this purpose by the Neil A. Maclean Company. The tarp is removed after 24 to 48 hours. The former period is adequate in warm weather: the latter may be required in cool weather.

#### Fumigants Sterilize Soil

If the soil has been cultivated, the gas penetrates to the depth of cultivation or a little deeper. Where the soil is not cultivated, gas penetrates for a few inches but no more. To the depth to which it penetrates, the fumigant completely sterilizes the soil, eliminating weeds, weed seeds, weed roots, nematodes, insects and certain plant diseases. When it

has done its work, Dowfume MC-2 leaves the soil in ideal condition to receive seeds of any kind, including grass seeds for new turf.

Where new grass is wanted in place of old, run-down turf, the chemical is applied directly over living turf, killing the old grass and weeds as they stand. After a heavy application of complete fertilizer, the grass seed is then planted on the soil surface through the dead grass. Heavy watering then serves to wash the seeds off the dead vegetation and bring them into contact with the soil.

#### Broad Spectrum Fumigants

All five of these soil fumigants have a broad spectrum of activity, controlling a wide range of soil pests. Where soil-borne diseases are a serious problem, Trizone and Pathofume (B) are said to be particularly effective.

Unlike the application of Dowfume MC-2, Trizone, Brozone, Pathofume (B), and Weedfume are injected into the soil from pressurized cylinders with a simple tractor-mounted, chisel-type applicator to a depth of about six inches. Chisels are spaced 12 inches apart.

Because the chisel-type applicator is used for injecting these fumigants, they may be used only in treating areas which have been plowed under and the soil worked up, or prepared, for turf renovation.

#### Use Plastic Tarp to Seal Soil

A plastic tarp is required to seal these fumigants in the soil, preferably within about 20 minutes following application. Where overall treatment of a large area is



Tractor-mounted, chisel-type applicators, such as this, can be used to inject fumigants into soil before planting seed.

carried out, the cover is laid manually. (In treating nursery seed and plant beds, the fumigant is injected and the tarp is laid simultaneously by a mechanical tarp-layer.)

Trizone and Pathofume (B) are recommended for use at 200 to 300 lbs. per acre, Brozone at 500 lbs. per acre, and Weedfume at 300 to 500 lbs. per acre. In each case, the treated soil is kept covered for at least 48 hours. Grass seed can be planted within three to four days after the cover is removed.

Whatever the method and materials used in treatment, the grass grows without competition from soil pests. And *how* it grows

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This is the same area shown on facing page. The obviously healthy stand of turf is evidence, the article says, of soil fumigation efficiency.



scaped highways," the road authority declared.

In a related speech, J. L. Beasley, Highway Landscape Supervisor, Massachusetts Department of Public Works, Boston, described the current turf management program underway in his commonwealth.

Beasley praised some of the current chemicals, such as MH-30, and mentioned products which he uses, such as Urox and Urab, but he spoke cautiously when addressing himself to the chemical industry.

This Massachusetts official feels firms are not engaging in enough research to develop products specifically for the highway market. "The chemical industry today is bypassing our potentially lucrative market," he challenged.

Beasley says Massachusetts uses contract applicators, and has about 140 contracts for roadside work.

Other sources have pegged the Massachusetts budget for this program at \$1,500,000.00 yearly.

This year's varied program was too diverse and too detailed to be adequately summed up in a news report, but the entire proceedings have been published by the North-

eastern Weed Control Conference and are available for \$4.50 a copy. Those wishing to add this volume to their reference material may write to Dr. John Meade, Secretary, Northeastern Weed Control Conference, Department of Agronomy, University of Maryland, College Park.

In charge of the 1963 conference was outgoing president Dr. Donald A. Schallock, Rutgers University, New Brunswick, N. J. Dr. Schallock now becomes chairman of the 1964 awards committee.

New president, and the helmsman who'll guide the Northeast weedmen towards their next conference, is A. J. Tafuro, American Cyanamid Co., Princeton, N.J. Second in command is new vice president, Dr. R. A. Peters, University of Connecticut, Storrs. Dr. John Meade is secretary-treasurer again in 1963.

Program chairman will be Dr. G. D. Hill, Jr., E. I. duPont de Nemours, Wilmington, Del. Next year's coordinating committee is headed by Dr. C. J. Noll of Pennsylvania State University, and Geigy Agricultural Chemical's J. Flanagan will head up the important public relations committee.

Sustaining memberships will be

guided by A. Lohr of Hercules Powder Co., Wilmington, Del., and Dr. Don Schallock will head the awards committee, a tradition for the outgoing president of the Northeastern Weed Control Conference.

Dr. Meade told *Weeds and Turf* that the 1964 conference will be January 8-10 at the Hotel New Yorker in Manhattan. Those who want advance information may communicate directly with Dr. Meade.

#### Soil Fumigation

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— producing thick, strong turf in a very short time. Because fumigation produces more vigorous turf, most of the problems with foliage diseases, such as dollar spot and brown patch, are eliminated. The same is true of the summer "browning out" in blue grass so common in certain areas of the country, notably the East.

As one participant in a soil fumigant job observed concerning a stand of new, healthy turf: "The beautiful thing about it was, all that came up was just what we planted."

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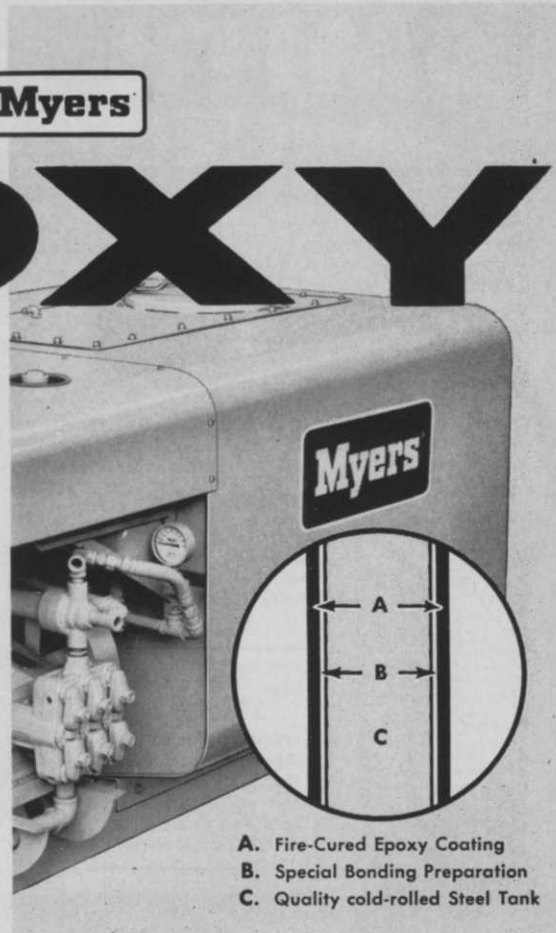
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