MANUAL APPLICATION OF METHYL BROMIDE--SOIL FUMIGANT

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Methyl bromide is a soil fumigant applied under a gasproof cover for treatment of seedbeds prior to seeding. Use of the chemical controls disease, insects, nematodes, and weeds, and stimulates growth. It is economical, effective, relatively easy to use, and can be spread either by hand or machine.

Wide areas can be covered in a single application of the fumigant by means of polyethylene covers. These range in size from 1,600 to 8,000 square feet, and may be conveniently reused from bed to bed or from one plot to another.

Methyl bromide gas comes in cylinders or in 1-pound cans. For small areas, the 1-pound can is cheaper despite higher initial cost. The gas is marketed under such trade names as Dowfume MC-2, Unico, and Pestmaster.

The equipment needed for manual gassing includes a 4 mil polyethylene film, a metering gage or scale to weigh out the gas, and evaporation cans to place under the film or a vaporizing unit to take the place of cans. The nurseryman will determine the width of the plastic sheet for his seedbed. It has been found, for example, that a 60-inch width is best for 4-foot beds, especially if the plastic is to be reused.

As a preliminary, prepare seedbed soil in the usual way. Set the gas in the sun or in a warm room so that it may heat to 60-80 degrees F. Postpone gassing if the morning is excessively wet or cold. A good time to gas is from 10:00-11:00 a. m. when the seedbeds are warm. Higher temperatures increase the destructive effectiveness of the fumigant on weeds and organisms. Also, remember that the beds should have good soil moisture for several days before they are treated.

Four men should be adequate to cover one-fifth of an acre during a morning's work. A 3-man crew can lay and flip over the plastic cover; 1 skilled man will be needed to inject the gas.

At every 15 to 30 feet, sink evaporation pans into the soil to within an inch of the top. Used quart oil cans, fruit juice cans, or antifreeze cans may serve as injection points. In each can, set firmly a plastic tube connected to the gas container. Determine the amount of fumigant for each station by using a meter gage or a platform scale mounted on a pickup truck. A strip 10 feet wide with an injection point every 25 feet would require enough fumigant for 250 square feet, or 1 pound per 100 square feet. Each station would then need 2.5 pounds of methyl bromide.

Spread the plastic film over the area, placing the sides and ends in a furrow or trench and sealing them with soil. Deduct the amount of gas to be used at a station from the total weight of the gas container, and set the balance at this reading. Let the fumigant flow into the cans beneath the film until the scale balances. Then close the valve, disconnect the hose, move to the next station, and reset the scale.

Gas is conducted through a 1/4-inch plastic tube with a special adapter on one end that will fit the valve on the gas cylinder, and a 1/4-inch compression nut on the other end to fit a similar compression nut on the tube in the evaporation can.

Soil temperature for this method of gassing should be 50^0 F. or more. For gassing in soil temperatures as low as 45^0 F., use a vaporizing unit. This insures more uniform distribution and control. It also eliminates the use of cans and tubes under the plastic cover. The vaporizing unit can be installed on the pickup along with the scales and the gas cylinder. A plastic tubing with necessary fitting connects the cylinder to the vaporizer. By means of a 3/4-inch plastic hose connected to the cylinder and placed under the cover

at a determined spacing (e.g., 25 feet), the gas is injected into the soil and the point of entry under the cover is sealed.

For effective gassing, include paths, pipelines, ditches, and end areas. Allow the cover to remain in place for at least 24 hours. In using the cover on a large area, only one edge of it need be reset after that period. The other edge is left firmly sealed in the soil when the cover is flipped over to treat an adjacent seedbed.

The rate of gas application will depend on the species and the severity of disease and weed problems. Weeds vary somewhat as to ease of kill, and plant species vary in their reactions to different soils gassed with the same strength. For example, at Vallonia a 2/3-pound treatment results in satisfactory weed control. It also controls shortleaf pine disease satisfactorily. It tends to overstimulate growth (unbalances top-root ratio) of shortleaf pine, does not upset top-root ratio of Virginia pine, and does not control disease in white pine, nor does it overstimulate or upset the top-root ratio of white pine. This means that constant testing or experience is needed to maintain good balance and an economical rate of application.

The growth-stimulation factor of methyl bromide, the most significant of the sterilization chemicals tested to date, varies from soil to soil. The average dose for easily produced and easily stimulated species, such as shortleaf pine, is one-half pound per 100 square feet. The maximum suggested dose for difficult-to-grow or hard-to-stimulate species, such as white pine, is 1 to 1-1/4 pounds per 100 square feet.

The average total cost of fumigating an acre with methyl bromide is $234.

As a safety precaution, wear goggles, face shield, and loose clothing when using methyl bromide. To avoid trapping or confining the gas, do not wear gloves. Remove clothing made wet by the liquid gas. Wipe off or aerate gas on the skin. Burns look severe; they turn white and swell but are not serious except in the eyes. If eyes are affected, rinse with water and rush to the doctor. Do not cover burns before they are aerated.