A RAPID METHOD OF FUMIGATING NURSERY SOILS WITH METHYL BROMIDE

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For fumigating soils in larger nurseries, efficient and complete machine gassing is more practical, economical, and timesaving than hand gassing.

Machinery has been developed that lays a polyethylene film on seedbeds and, as it is being laid, injects methyl bromide under the film in the form of a vapor (fig. 1). Using this method, it was possible to treat a 4- by 525-foot seedbed in one-half of a man-hour. This compared with about 10 man-hours on a similar plot, using methods employed in hand gassing.

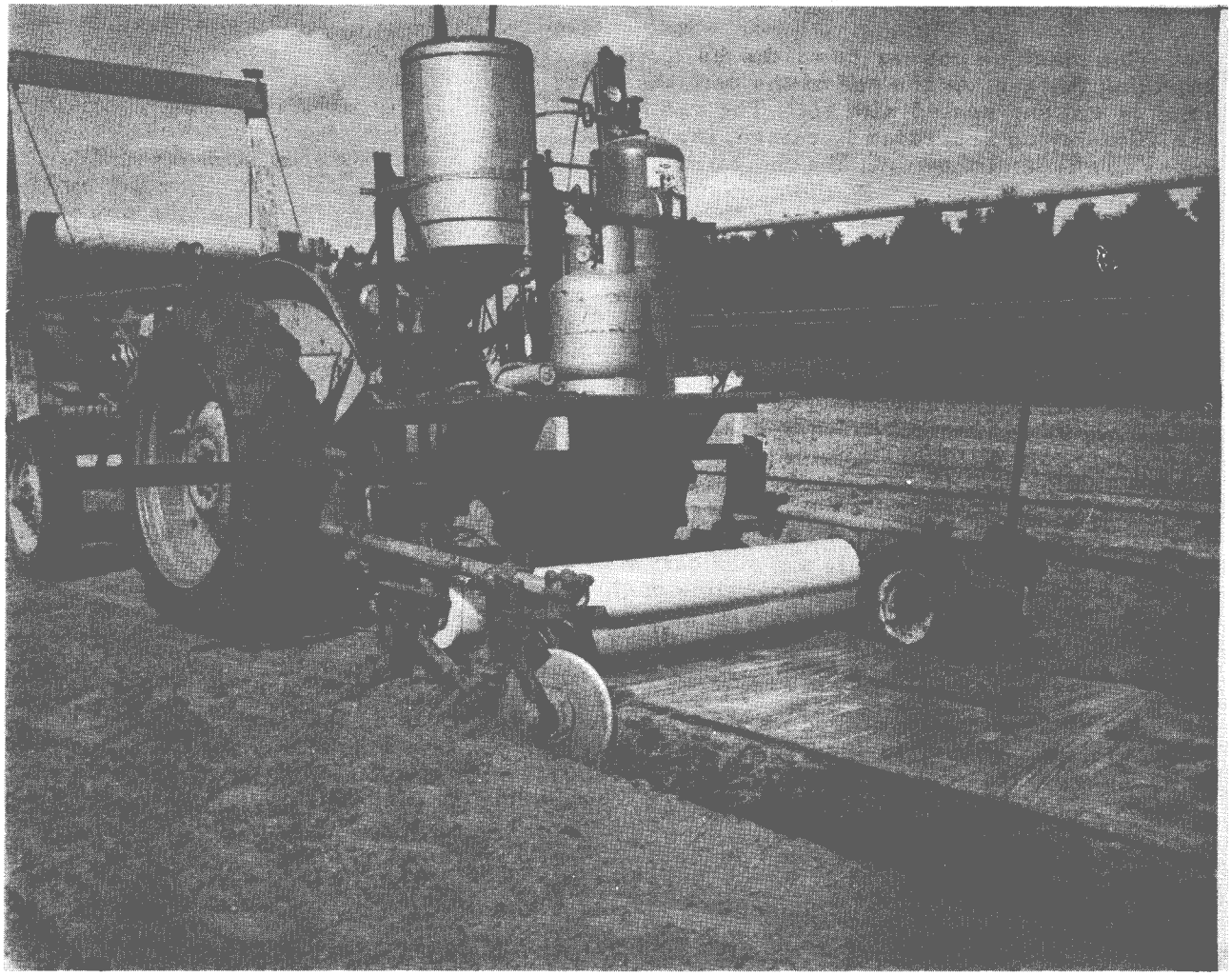

Figure 1.--A film-laying machine used to cover and fumigate seedbeds.

When the plastic cover was laid by hand, a 4 mil polyethylene film was needed to withstand the handling and permit its reuse. With a film-laying machine, a 2 mil polyethylene film weighing and costing half as much is equally effective. The film can be used several times if handled carefully.

The machine is made up mostly of standard cultivator and planter parts. It is available commercially, or may be made in a local shop from plans that can be furnished.

The important components of the machine are the film-laying apparatus, which can be raised from or lowered to the ground, a cylinder of methyl bromide gas, a vaporizer, a gas burner, and a branched 1/2-inch plastic pipe system that extends under the film or cover about 10 feet. All parts are mounted on a tractor or attached to it.

The film passes under a roller, which places the film flat on the soil and prevents the wind from blowing it. Disks attached to the front of the machine open a trench on each side of the bed. Rubber-tired wheels press the edges of the film into the trench, and the rear disks or scrapers roll soil in on the edges, thereby sealing them.

The machine advances into the bed until the plastic gas tubes attached to the vaporizing unit are under the film. Then the tractor is stopped so that the end of the film can be sealed with soil, and the rest of the laid film inspected to make sure that it, too, is sealed. This done, the tractor operator turns on the fumigant, discharging the necessary amount of gas into the soil.

The machine moves down the seedbed at a predetermined rate, laying the film and injecting the gas. At the end of the bed, the operator turns the gas off while the end of the film is cut and sealed with soil. The gas is then turned on for about a second. After that, the film-laying apparatus is raised, the operator drives the tractor forward until the gas tubes are free of the film, and the remainder of the film on the soil is sealed.

The fumigant runs through the vaporizing unit before it is injected into the soil. This unit consists of copper tubing coiled and placed in a 30-gallon, water-filled steel drum. A gas burner heats the water. A pressure-reducing regulator insures the injection of a constant flow of the fumigant regardless of pressure. The regulator found best for this purpose has a calibrated dial that regulates the delivery of water. It does the job without freezing up under constant use, and automatically adjusts itself for pressure change.

The use of the vaporizer permits fumigation when the soil temperature is as low as 45 degrees. Its use may require less fumigant per acre; also, the soil may need fewer hours of cover. This, however, is for the individual nursery to determine. The usual period for the soil to remain covered is 24 hours.

A machine called the "Poly-triever" has been developed to pick up and reroll the polyethylene soil cover. It is a modification of the apparatus that rolled up burlap used to mulch seedbeds. The machine consists of three rollers mounted on a tractor. Two of the rollers force the soil used to seal the cover to the side, and also keep the cover fully stretched so that it will rewind easily. Between the two rollers, cylindrical brushes, driven by a small gasoline motor, remove the soil and water from the film.

The third roller, powered by an air-cooled motor, rolls up the film. The edges of the film must be guided to insure an even roll. Working this machine, 3 men could roll up the film on a 525-foot bed in 10 to 15 minutes. Many refinements will doubtlessly develop on the Poly-triever as its use grows, improving both the efficiency and ease of the operation.