Page 338 PRESSURE APPARATUS FOR INJECTING CHEMICALS INTO TREES

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ABSTRACT

A new pressure injector for forcing liquid fungicides, insecticides, or fertilizers into trees is light weight and can be installed on a tree in less than 10 minutes. Materials to build it cost approximately $12.00.

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Arborists need a practical device for injecting systemic chemicals into trees. A gravity-flow injector such as the one described by Schreiber (3) is cheap and satisfactory for control of elm phloem necrosis, but introducing sufficient chemical into the tree trunk with this device may take several days.

Pressure injection as described by Jones, et al. (2) can be completed in much less time, but available apparatus is expensive and cumbersome. A light-weight pressure injector can be built quickly and cheaply in a typical workshop.

CONSTRUCTION

A 12-liter pressure tank designed to hold freon is ideal, and empty tanks should be available at no cost from a local refrigeration and appliance company. Similar tanks may also be purchased for under $7.00 from Lyn-Mar-Industries, Lithonia, Georgia. Materials needed to convert the tank include a hose to pipe adapter, a valve, two 3/8-inch nipples, a 3/8-inch tee, a bushing (3/8 x 1/4 inch), and a 1/4-inch Shrader tank valve (Fig. 1). These parts cost approximately $5.00. A pressure gauge may be added, but it is an accessory because the air pressure can be checked with an ordinary tire gauge when the tank is filled. The freon tank can be converted to a chemical pressure tank in less than 1 hour.

A lag bolt can be modified on a metal lathe for screwing into trees and passing chemical. To do so, remove the head from a standard 2.5-inch-long by 1/2-inch-diameter lag bolt. Bore a 1/4-inch hole through the center of the bolt. File the shank on two sides so a wrench can be used to screw the threaded portion into a tree (Fig. 2).

OPERATION

The chemical is added through tubing attached to the tank. It must be added before the tank is pressurized (Fig. 3). The cut-off valve is then closed and 65 psi of air are applied through the air valve. The tank is then ready to be installed on a tree.

A hole 3 inches deep is drilled into the tree with a 1/2-inch-diameter increment borer, and the core is removed. The lag bolt is screwed into the tree, the tubing from the tank is attached, the tank is inverted and attached to the tree, and the cut-off valve is opened (Fig. 4). Installation requires about 10 minutes.

PERFORMANCE

The pressure injection system was first used in June 1972 to inject tetracycline into diseased elms for the control of phloem necrosis. A single injection hole per tree was used on each date of treatment. For each subsequent treatment, a new hole was drilled at a different cardinal direction until the chemical was injected on all sides of the tree. Liquids were also injected into sweetgum, red oaks, pecan, sycamore, and ash with the pressure tanks.

Two thousand mg of tetracycline dissolved in 1 liter of water were injected at 65 lb pressure into each diseased elm tree. The rate of movement of chemical into the tree varied with the size of tree and time of application (Table 1). The maximum time required for elm trees was 2 hours, and the average was approximately 30 minutes.

Table 1. Tetracycline and oxytetracycline injected into diseased elms at 65 psi on various dates.

Elm Species	DBH	Tetracycline (ml/hr)			Oxytetracycline (ml/hr)	
		6-28-72	7-17-72	8-4-72	7-17-72	8-4-72
Cedar	19	1,350			1,200	500
Cedar	21	1,250	2,000			3,000
Cedar	10	840	1,200			1,200
American	33	19,980		4,000	2,000	
Cedar	19	1,320		2,000	1,000	
Cedar	7	500		660	660	
American	9	780	1,560			780
American	15	1,680	1,680	1,500		

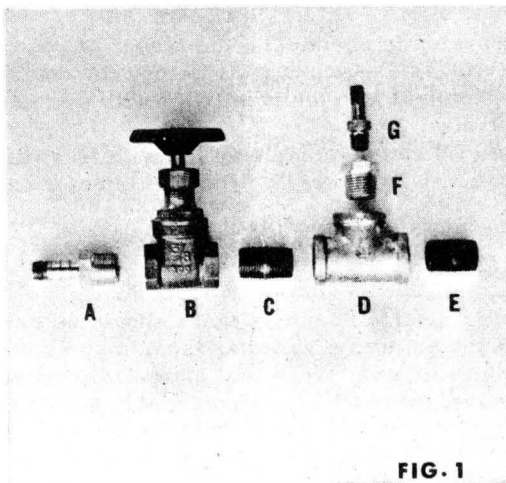

FIG. 1

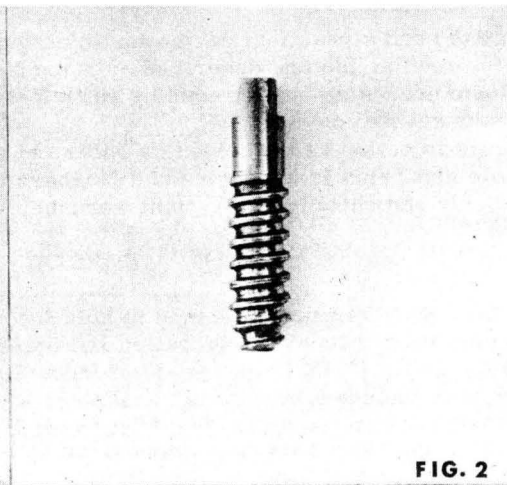

FIG. 2

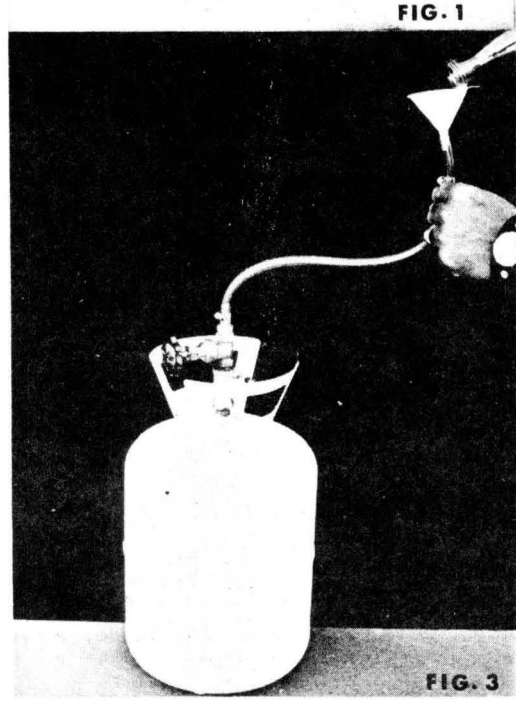

FIG. 3

FIG. 4

FIGURE 1. Pipe fittings (3/8-inch diameter) needed to convert freon tank to pressure tank: A) Hose to pipe adapter; B) valve; C) nipple; D) 3/8-inch tee; E) nipple; F) bushing (3/8 x 1/4 inch); and G) 1/4-inch Shrader tank valve.
FIGURE 2. Lag bolt was modified to conduct liquids into tree and to stopper the hole.
FIGURE 3. Liquid is poured through a plastic tube into tank before pressure is applied.
FIGURE 4. Pressure tank installed on tree. Arrow shows lag bolt.

At 65 psi the times required to inject 1 liter into hardwoods of other species were: sycamore, 10 minutes; red oak, 15 minutes; sweetgum, 45 minutes; green ash, 80 minutes; and pecan, 120 minutes.

DISCUSSION

The pressure injector developed at the Southern Hardwoods Laboratory was designed independently of work reported by Himelick (1). The injector screw constructed from a lag bolt by Himelick is almost identical to the one developed by our staff. Other than the lag bolt, there is no similarity between our equipment and Himelick's.

Literature Cited

1. HIMELICK, E. B. 1972. High pressure injection of chemicals into trees. Arborist's News 37: 97-106.
2. JONES, T. W., and G. F. GREGORY. 1971. An apparatus for pressure injection of solutions into trees. USDA For. Serv. Res. Pap. NE-233, 7 pp. Northeast. For. Exp. Sta., Upper Darby, Pennsylvania.
3. SCHREIBER, L. R. 1969. A method for the injection of chemicals into trees. Plant Dis. Reptr. 53: 764-765.