A CARBON DIOXIDE POWERED SPRAYER FOR SMALL PLOTS

Devices have recently been described by Robinson and Dunham and by Shaw for use in applying herbicides and other materials to experimental plots. The sprayer developed by Shaw is described as being particularly adapted to plots of more than a few square feet in size. With this sprayer uniform rates of application are obtained by moving the closely calibrated equipment at a uniform speed over the area to be covered. Experimental areas available are often small, however, or there may be no gain in precision by using more than rod-row plots. For such conditions a sprayer of the type described by Robinson and Dunham is more adaptable. To insure accuracy of application the spray material required for each plot is measured and applied separately as uniformly as possible.

A sprayer for small plots, utilizing compressed carbon dioxide as a source of pressure, was used successfully at Madison, Wis., during 1949 and 1950. The essential features of the sprayer, shown in Fig. 1, are a 7-ounce carbon dioxide cylinder (A), a reducing valve such as is used in inflating tires (B), a knapsack sprayer shutoff valve (C), a pressure gauge (D), a check valve (E), a spray tank that also serves as a handle grip (F), a filler plug (G), a boom of suitable size (H), and nozzles (I). The spray tanks and fittings are preferably made of brass or aluminum to avoid corrosion, but thin wall steel conduit and galvanized pipe and fittings are satisfactory for most uses. It is desirable to have tank and boom assemblies for different treatments to avoid contamination due to handling. The weight of the assembled sprayer is about 9 pounds.

For operation the power supply is connected to the tank and boom assembly. The filler plug is removed from the tank and a measured quantity of carbon dioxide is added. The filler plug is replaced, the boom is depressed, and the gas released by opening the shut-off valve. With one person preparing and measuring solutions and another making applications it is possible to treat plots at the rate of about 40 per hour. Most of the plots treated have been from 30 to 40 square feet in size but plots of as much as 1 or 2 square rods may be treated by using a tank of suitable capacity. The sprayer is light and easily manipulated, for the power supply is self contained rather than being an auxiliary compressed air tank.

A small cylinder of carbon dioxide will usually suffice for from 60 to 100 plots depending on the economy of gas use. The cylinders may be obtained by most firms handling carbon dioxide. A refilling device the 7-ounce cylinder may be charged easily from 20- to 50-pound bulk cost of about 10 cents a refill. The reducing valve is originally set to operate at about 30 pounds pressure, but by varying the tension on an inch, but by varying the tension on an inch, a range of from 25 to 40 pounds pressure is possible.

Coefficients of variability ranging from 8 to 16% were obtained using this sprayer on studies of the responses of oats, peas, and corn to herbicides. These coefficients are only slightly more than those expected at Madison from varietal yield trial experiments. This indicates that this equipment can be used without increasing the experimental error appreciably.

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SOME FACTORS INFLUENCING THE ROOTING OF RED CLOVER CUTTINGS

A rapid and simple method for propagating clones of red clover is desirable in a program of plant breeding for resistance to disease. Two procedures, both considered of general significance, were used. One was the slow, and plants are often predisposed to infection by various plant pathogens. The latter method has not apparently proved to be satisfactory because of a number of factors not ade-

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Fig. 1.—Carbon dioxide powered sprayer.