

METHOD OF USE

The machine is simple to operate. The diluent tank is filled (usually with water) and the chemical tank is filled with spray material at the desired peak concentration. The step control tube is set to achieve the desired dilution ratio (most commonly 1:2). The pressure is turned on and then spraying in the conventional manner is carried out until the sprayer discharges gas; this is when the level of the spray material reaches the inlet in the step control tube. The pressure is turned off and the tank vent is opened. The chemical tank is refilled with diluent, diluting the original concentration by the amount of material sprayed out for the first step. The tank vent is closed, pressure re-applied, and the next step is sprayed. This procedure can be repeated for as many steps as desired.

THE DEVELOPMENT OF A MULTI-PURPOSE PRECISION BOOM SPRAYER

B.H. Hyde-Wyatt,
Department of Agriculture, Tasmania.

In designing a sprayer the main object is to produce a versatile machine capable of performing a wide range of functions including:

- (1) orthodox boom spraying of both small plots and areas up to an acre
- (2) band spraying
- (3) simultaneous drilling and spraying
- (4) simultaneous application of two materials
- (5) simultaneous application and soil incorporation
- (6) logarithmic application

A prime mover of adequate power to ensure good speed regulation and to allow the use of auxiliary equipment (e.g. precision seed drills) was considered essential.

A unit has been developed around a Honda F 190 5 hp two-wheel tractor and a Hardi 600 twin-diaphragm pump fitted with two model 500 heads to convert it to a double pump.

Factors that influenced the selection of the Honda included dog clutches on each wheel for manoeuvrability, a six forward speed gear box giving ground speeds from 1.1 to 15.4 ft (0.34 to 4.7 metres) per second at 4,500 r.p.m., and the facility to take a drive from either the p.t.o. or the front of the crankshaft when the p.t.o. is in use, for example with a rotary hoe for soil incorporation.

Compared with a gear pump the Hardi is heavy, but this is more than outweighed by its ability to handle abrasive formulations. For ultra high volume application both halves of the pump can be coupled, but normally one side is used for the herbicides and the other for water to flush out the system between treatments. For the simultaneous application of two materials each half of the pump is connected to its own nozzle system and herbicide container.

The front-mounted boom is adjustable in height from 1 to 4 ft (305-1,220 cm), and carries six nozzles (any of which can be shut off if required) that can be spaced at 15-21 in. (38-53 cm) apart in 1 in. (2.54 cm) steps. For ordinary plot work the boom is offset to the right. A larger boom or one designed for different spacing can be fitted as required.

Nozzles are supplied by separate lines all the same length for logarithmic work. Spraying System nozzles are used because of the wide range of tips available. These are made up in sets, nozzles being matched for throughput and pattern, and the set tested on a patternator to determine correct spacing, working, height, and pressure.

Materials being applied are carried in a rack next to the pump in small containers, which are changed between treatments. All the spraying equipment is mounted on a separate subframe which can be easily removed. A ride-on trailer can be fitted which carries extra tanks for spraying large areas. It has a tool bar for row-crop work, and is used when trailed equipment, e.g. drills, is employed.

The machine was built by departmental staff. This allowed the design to be developed during construction and amended to accommodate the components available.