striking the target. The proportion of droplets bouncing off the target was also smaller with the low-volume pattern. The hollow cone nozzles projected droplets towards the small wild oat plants from every direction whereas those from the flat fan nozzles could only be directed forward.

A spray pattern with droplets in the 100-200 micron range appears to be highly suitable for post-emergence wild oat spraying. However, such a pattern would be detrimental to the application of 2,4-D to wheat. There would be little increase in efficiency as far as the broadleaved weeds were concerned but the wheat could be damaged by overdosage. Some dicotyledonous weeds may require spray patterns with all the droplets in the 600-1,000 micron range; these droplets would tend to miss the wheat but not the broadleaved weed.

Festiguay and Olympic wheat become relatively susceptible to barban about the time they begin to assume a prostrate habit. This increase in susceptibility may be due to an increase in the amount of herbicide deposited on the leaf. A horizontal leaf would collect more herbicide from the 10 gal. per acre spray pattern used in determining the susceptibility of Festiguay and Olympic to barban.

LOGARITHMIC STEP SPRAYER FOR FIELD SCREENING OF HERBICIDES

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INTRODUCTION

ICIANZ carries out its initial screening of herbicides in the laboratories at 'Merrindale' in Croydon, Vic. The step log sprayer was developed to enable a quick crosscheck of laboratory results in the field. A continuous log sprayer is of limited use for this purpose, because one concentration occurs only instanteously during spraying. The step log sprayer puts out a given concentration for a given time, and several concentrations

can be looked at using a very small quantity of chemical. A number of rates can be examined, in a simple stepping downwards of concentration. The whole unit is light and easily transported from site to site in the boot of a car.

THEORY

The step log sprayer applies chemical in a logarithmic series but it does so in discrete steps. The steps can be adjusted to reduce from peak dosage level in any desired ratio. The theory is similar to a continuous log sprayer but instead of continuous dilution in the chemical tank there is a stepwise dilution. The series of steps follow the same curve as a continuous log sprayer. Plot size is governed by the size of chemical tank, size of boom, and dilution rate.

DESCRIPTION

The machine consists of the following units:

(1) A plastic diluent tank, of approximately 1 gal. capacity and a pressurized gas bottle are in one unit which is slung on the operator's back. The gas bottle, containing an inert gas, as supplied normally for refrigerant use, is fitted with a control valve and provides the pressure source. The diluent runs into the chemical tank by gravity.

(2) A stainless-steel step control unit, fitted with a hook, hangs from the operator's waist on a belt. The unit consists of a head embodying the step control tube, diluent tap, pressure tap, and a vent which is funnel shaped and is used for filling the chemical tank with chemical before the first step is sprayed.
A scale is fitted beside the step control tube so that the dilution rate can be adjusted accurately and quickly. A stainless-steel chemical tank is attached to the head of the step control unit. The tank is easily removed for filling with chemical. Various tank sizes can be used.

(3) A hand lance which is connected to the step control tube by a flexible hose. The lance has interchangeable booms, one of two nozzles and another of four nozzles, and is fitted with a pressure gauge.

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

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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