A NEW ANTI-DRIFT SYSTEM FOR PESTICIDE APPLICATION

S. T. ASTON

Frank M. Winstone (Merchants) Ltd., Auckland

Summary

This paper introduces a new technique in pesticide spray application involving the use of specially developed air aspirating nozzles. These nozzles are used in conjunction with a foaming agent which is added to the ordinary spray being used. Physical changes of the spray droplet afforded by the foam technique reduces fines and thereby drift.

INTRODUCTION

Many systems have been devised over the years to control the drift of potentially hazardous agricultural chemicals. Two of the major techniques developed for anti-drift control were "Invert emulsions" and "Thickening agents". Although these systems were very effective in many situations, the physical complexities and/or the extra cost involved precluded their widespread adoption. Over the last two to three years, a new system has been developed utilising a foaming agent and applied with a special air aspirating nozzle. This system has provided a simple and inexpensive method of drift control. The foam spray technique has several other side benefits which should prove to be advantageous in many situations.

DESCRIPTION OF NOZZLES

BASIC DELA-FOAM* NOZZLE TYPES USED FOR FOAM APPLICATION

(Illustration A) — Type DFA Nozzle used for "Aircraft Boom" and "Hand Gun" Spraying.

These nozzles give a jet of foam that breaks up into foam droplets soon after leaving the nozzle. They can be used at low pressures for aircraft application from 30 litres/ha and up to 1000 litres/ha. The optimum pressure in this type of application is 300 kPa.

When used for a hand gun application these nozzles are used at higher pressures up to 2000 kPa and depending on metering orifice size a throw of 12 m plus can be obtained. Using standard hand guns, the

* Registered brand name of Delevan Manufacturing Co., USA.

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drift from this distance of throw can be large, but by using foaming agents and the special foam nozzles drift can be markedly reduced in marginal conditions.

(Illustration B) — Type DFOC fitted with special deflector tip suitable for use with a hand gun for spot treatment.

This nozzle is similar to its mode of action to the DFA nozzle discussed above, but with the addition of the deflector tip which is specially calibrated for these nozzles. This tip is suitable for all roadside, trackside, and other similar jobs.

The same metering orifices that fit the DFA nozzle fit the DFOC nozzles, and flow rates are similar. A throw of up to 6 m can be obtained with a swath width of 4 to 5 m. These nozzles are best operated at pressures between 600 to 2000 kPa.

(Illustration C) — Type DF Nozzle suitable for ground boom spraying for pasture and crop work.

These nozzles give a normal fan type spray but instead of small droplets that can drift they produce a flat foam spray. These tips are available in a variety of sizes. The 80° fan D.F. tip is equivalent to a 73° standard F.S. tip (Delevan Manufacture).

ASSESSMENT OF CROSS-WIND EFFECTS ON AERIAL APPLICATION

The top illustration shows a single swath spray pattern produced from an aircraft application of foam spray.

The bottom illustration provides a comparison with a single swath spray pattern produced from standard spray nozzles without foaming agent.

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The particulars of these applications are as follows:—

Date: 25/7/73

Place: Tauranga

Time: 3.15 p.m.

Weather: Fine, cool, light southerly of 9 to 10.5 km/h.

Sample cards were spaced at 3.05 m intervals across the flight path.

The standard spray width is 30.5 m with this equipment.

In the case of the standard spray test strip drift was located as far as 100 m downwind of the flight line whereas the foam strip gave quite a sharp cut off a short distance outside the normal lap width.

Rate of Application: 26 litres/ha of total spray

Pressure: 263 kPa

Aircraft Height: 9 m

Aircraft Speed: 160 km/h

DISCUSSION

The foam system is already widely used overseas for application of weedicides and insecticides and claims made in this article are supported by confidential data from some of this work. The foam system is particularly useful for application of general vegetation weedkillers applied by hand gun in built-up areas, and in cropping districts.

The addition of foam at the rate of 0.5 to 1% of the total spray mixture, provides adequate foaming to give good control of the spray for treatment of roadside verges, street curbing, marker posts, bridge approaches and directed spot treatment around shrubs and trees. DEL-FOAM* is compatible with all commonly used general vegetation weedicides. The use of this foaming agent replaces the need for any additional wetting agent.

The adoption of the foam system of spraying for aerial application provides very significant drift control, and thereby increases effective flying time. In the case of application of highly toxic insecticides, the use of a foaming agent may well offer greater protection to the operator.

The foam technique offers interesting possibilities in the case of crop spraying, particularly where application conditions are marginal such as occur under constant windy weather. The addition of foam may well cause a serious reduction in selectivity by causing a higher degree of absorption of the herbicide by the crop.

Some of the basic research areas which could be explored to advantage are:—

- (a) Measurement of herbicide uptake by the plant at varying rates of application with and without foaming agents.
- (b) Accurate measurement of control of spray on to the target area with and without foam additives.
- (c) Assessment of the effects of foam on selective crop herbicides. It is possible that the addition of foam in some cases, will enable the rate of herbicide to be reduced, and thereby offset the possible reduction in selectivity.

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* Trade name (Winstone's foaming agent).