



This typical Spra-Disk, an applying device which accommodates use of invert emulsions, can be controlled by the pilot from inside his helicopter. Spray material is fed into the disk by gravity from saddle tanks mounted on both sides of the aircraft.

INVERT EMULSIONS: INSOISLUME TREVNI

The Inside-Out Sprays

EARLY one morning in May a helicopter took off from an isolated area in the West Virginia mountains. As the ship left the small clearing it headed toward a utility right-of-way which traversed the mountain range. As the aircraft approached the right-of-way the pilot performed a series of operations and suddenly a disk mounted under the ship's nose began spinning. At the same time large, white droplets began falling from the disk in a uniform, circular pattern. The droplets originated from nozzles mounted on the disk at set intervals. They were droplets of the "inside out" spray and were being applied to control woody vegetation on the right-of-way below.

By JACK TAYLOR

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The "inside out" sprays are actually a form of 2,4-D, 2,4,5-T or a mixture of both. They were born of a need which began back in 1949 when Amchem Products, Inc., developed the original formulations of these two herbicides.

2,4-D Heralds New Era

With the birth of 2,4-D and 2,4,5-T came a whole new era in the herbicide field. With them, also, came problems associated with any new ideas, the two most important of which were volatility and drift. Shortly after these discoveries, the same com-

pany succeeded in developing low-volatile formulations of these two herbicides. This solved the problem of volatility but the even more serious problem of drift remained.

With the problem of drift in mind this same company developed the "inside out" sprays, commonly called invert emulsions. Standard mixtures of 2,4-D and 2,4,5-T are normally formulated as oil-in-water emulsions. The inverts, on the other hand, are formulated as water-in-oil emulsions, hence the name "inside out" sprays.

Characteristic of the inverts is their tendency to thicken when water is added and they are agitated. When properly mixed they reach a consistency

approaching that of mayonnaise. In a like manner, these same invert emulsions become thinner as oil is mixed with them.

By their very nature the inverts appeared to offer a way of spraying with very little of the normal drift associated with 2,4-D and 2,4,5-T. The fact that they were thick and viscous meant there would be far less tendency for the material to break up when put through a sprayer. The sprayer, however, proved to be another problem.

Needed New Sprayer

It was learned quite quickly that conventional boom-type applicators as well as some modified types of these sprayers would not adequately disperse the inverts in their most desirable form. In order for them to pass through this equipment they have to be thinned which defeats the objective of providing a low-drift system.

Amchem conceived and engineered a radical new sprayer designed to retain the desirable, low-drift properties associated with a thick invert emulsion. This applicator was called a Spra-Disk* and was of a centrifugal type which was gravity fed. Mounted on a helicopter equipped with saddle tanks, it could be operated by the pilot and regulated to spray a vari-

able-width swath. Since there were no pumps to change the viscosity of the material once it was in the helicopter's tanks, it could be applied through the disk in uniform, large droplets which had little tendency to break up and cause subsequent drift. With uniform viscosity and set nozzles, per acre rates are determined by the speed of the aircraft. Both the volume per minute and swath width vary with changes in rpm of the disk. The rate per acre is constant over the full range of swath widths when maintaining a constant forward speed.

Invert emulsions should be applied by trained, experienced pilots. The accuracy of these low volume application rates depends largely on the height and speed of the helicopter as well as the speed at which the disk is rotated, hence the pilot plays a major role in the successful application of them.

Good for Rights-of-Way

At the present time, the greatest use of the invert emulsion is in the control of woody growth on utility rights-of-way. Since many of these rights-of-way lie in areas where drift damage would be highly undesirable the invert emulsions fill an important need, as most conventional materials have proved unsuitable in these situations.

*Registered trademark, Amchem Products, Inc.

Pattern on these leaves resulted from an actual invert emulsion application. Note uniformity of the droplet pattern.



Book Review

Turf Management

by H. Burton Musser, McGraw-Hill Book Company, New York, N.Y. 1962, 356 pages, \$10.95.

Who are universally respected for their knowledge of soils, grasses, and care and maintenance of turf? Greenskeepers, of course, whose successes with turf have inspired millions of homeowners to envy, and attempt to imitate, their lush fairways and neatly trimmed greens.

Now information about corrective turf treatment can be extracted from the standard text of greenskeepers and golf course superintendents. *Turf Management* by H. Burton Musser is newly available in revised form. Originally prepared in 1950 by Musser, of the University of Pennsylvania, and assisted by turf experts from all over the United States, this book will be useful to CAs in all parts of the U.S. as well.

Sponsored by the United States Golf Association, which spends a great deal of money each year for turf research, *Turf Management* will serve as a practical guide for all those working toward maintenance of large turf areas.

Soil acidity, porosity and microorganism content all play important roles in producing healthy turf. These categories are thoroughly discussed in layman's terms; though the author sometimes deals with technical material, he explains it simply and very clearly. Tests for various soil chemicals tell what other treatments should be made to maintain proper balance of minerals and plant food material. Functions of fertilizing and liming practices are outlined, and proper handling and application techniques are illustrated.

For those who want an automatic irrigation system, turf requirements and sprinkler systems are detailed along with general watering practices which are of general interest to everyone with a lawn maintenance business.

Although we are not all greenskeepers, this book should be placed high on any CA's reading list. *Turf Management* contains information clearly and concisely put for anyone involved in the management and correction of difficulties on large areas of turf.