SUMMARY

The Chesterford Logarithmic Sprayer can be very useful in the preliminary assessment of herbicides. The sprayer mounted on a Land Rover was calibrated by spraying sodium chloride solution and titrating spray samples with silver nitrate solution. The half dosage distance was found to be 14.7 feet and the rate applied at 15 feet from the start of the plot was 0.70 of the original concentration.

The efficiency of the stirrer in maintaining solids in suspension in the concentrate tank was investigated, using diuron and allowing various intervals of time before starting to spray. After an interval of two minutes, the decrease in dosage was still logarithmic, showing that the stirrer was efficient in spite of the fact that it functions only when the unit is in motion.

Various methods of weed estimation were used in the first experiment in an attempt to relate the logarithmic decrease in dosage to the response on the weeds. The line transect method was found to be adequate for that purpose.

Simazine, fenuron, NPA and chlorpropham were applied before the emergence of weed seedlings on fallow land previously infested with Brachiaria platyphyllum Nash. Simazine at 2.3 lb per acre* gave the best control of B. platyphyllum for one month and at two months after spraying rates above 4 lb per acre still had a residual effect.

The effect of two formulations of 2,4-D, the triethanolamine salt and the ethyl ester, was compared in the control of Amaranthus dubius Mart. and A. gracilis Desf. in

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* Except where otherwise stated, all rates of herbicides are expressed in lb of active ingredient per acre.

THE VEGETATIVE AND FLOWERING STAGES. BOTH FORMULATIONS GAVE COMPLETE KILL OF THE 2 SPECIES AT RATES AS LOW AS 0.25 LB acid equivalent PER ACRE.

TWO PHENOXYACETIC ACID DERIVATIVES, 2,4-D AND 2,4,5-T, AND TWO PHENOXYPROPIONIC ACID DERIVATIVES, MECOPROP AND 2,4,5-TP WERE USED IN PASTURES FOR THE CONTROL OF MIMOSA PUDICA L. 2,4,5-T AND 2,4,5-TP WERE VERY EFFECTIVE AT 0.5 AND 1.0 LB ACID EQUIVALENT PER ACRE RESPECTIVELY, GIVING COMPLETE CONTROL OF M. PUDICA FOR 4 MONTHS WHEREAS 2,4-D AND MECOPROP HAD ONLY A SLIGHT AND TEMPORARY EFFECT AT 4 LB PER ACRE.

LOGARITHMIC PLOTS WERE ALSO LAID DOWN TO ASSESS THE EFFECT OF SEVERAL HERBICIDES ON CROPS. IN A PRE-EMERGENCE (BEFORE THE EMERGENCE OF BOTH WEEDS AND CROP) TRIAL IN MAIZE USING SIMAZINE, SIMAZINE + 2,4-D (AMINE), ATRAZINE, FENURON AND DALAPON, THE MOST PROMISING TREATMENTS WERE SIMAZINE AT 2 LB PER ACRE, ATRAZINE AT 2.5 LB PER ACRE AND SIMAZINE AT 1 LB PER ACRE + 2,4-D AT ¾ LB ACID EQUIVALENT PER ACRE. FENURON AT RATES ABOVE 2.4 LB PER ACRE CAUSED SEVERE STUNTING IN MAIZE BUT GAVE MODERATE CONTROL OF CYPERUS ROTUNDUS L. AT 2 LB PER ACRE.

THE TOLERANCE OF SUGAR CANE TO HIGH RATES OF SIMAZINE, DIURON AND ATRAZINE APPLIED AS PRE-EMERGENCE TREATMENTS WAS ALSO INVESTIGATED. THE CROP WAS TOLERANT TO SIMAZINE AT 20 LB PER ACRE, DIURON AT 32 LB PER ACRE AND ATRAZINE AT 20 LB PER ACRE. POST EMERGENCE TRIALS (AFTER EMERGENCE OF BOTH WEEDS AND CROP) IN SUGAR CANE WERE ALSO LAID DOWN USING DIURON, ATRAZINE, SIMAZINE, SIMAZINE + 2,4-D (AMINE) AND DIURON + 2,4-D (AMINE). SIMAZINE AT 8 LB PER ACRE ALONE OR WITH 2,4-D (AMINE) AT 1.25 LB ACID EQUIVALENT PER ACRE AND ATRAZINE AT 20 LB PER ACRE APPEARED TO BE SAFER THAN DIURON AT 12.8 LB PER ACRE ALONE OR IN COMBINATION WITH 2,4-D (AMINE) AT 1.25 LB ACID EQUIVALENT PER ACRE. HOWEVER THE NEWLY ADOPTED ESTATE PRACTICE OF

APPLYING DIURON AT 2.4 LB PER ACRE + 2,4-D (AMINE) AT 0.94 LB ACID EQUIVALENT PER ACRE AS POST EMERGENCE TREATMENT SEEMS TO BE FAIRLY SAFE ON SUGAR CANE, THOUGH THE TOLERANCE OF THE CROP TO HIGH RATES OF DIURON, ESPECIALLY ON SOILS DEFICIENT IN PHOSPHATE, NEEDS FURTHER INVESTIGATION.

THE LARGE SIZE OF A LOGARITHMIC PLOT TENDS TO LIMIT THE USE OF THE CHESTERFORD LOGARITHMIC SPRAYER FOR WEED RESPONSE TO POST-EMERGENCE TRIALS WHERE THE PLOT CAN BE CHOSEN FOR ITS UNIFORMITY IN WEED POPULATION. CONSEQUENTLY AN ATTEMPT WAS MADE TO DESIGN A VARIABLE DOSAGE TRACK SPRAYER FOR SMALL PLOT USE BY VARYING THE SPEED OF THE SPRAYER. THE ATTEMPT WAS HOWEVER UNSUCCESSFUL. OTHER POSSIBLE ARRANGEMENTS FOR SUCCESSIVE HALVING OF THE DOSAGE RATE BY DOUBLING THE SPEED OF THE SPRAYER AUTOMATICALLY THROUGH GEARS OR BY DILUTION WITH WATER ARE ALSO DESCRIBED.