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A S T U D Y
of the
SUSCEPTIBILITY TO DALAPON
of
FOUR COMMON PASTURE SPECIES.

A Thesis presented at Massey Agricultural College
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by
H. M. Lawson
Massey Agricultural College

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Jacques

A STUDY OF THE SUSCEPTIBILITY TO DALAPON OF FOUR COMMON PASTURE SPECIES

H.M. Lawson.

p.44 Table II. The first F ratio is < 1 .

p.46 Line 2. This sentence implies that randomization overcame the effects of decreased plot area.

p.49 Line 24. In cases where bulked treatment yields were used to give common dry matter percentages, analyses should be on a Greenweight if this applied to all treatments. It is assumed that this happened only on odd occasions for a single treatment.

In some of the tables of means (e.g. Table XVI p 77) d.05, d.01, d.001 are given where the analyses show no significant differences between the treatments. Where the treatments range from 31 to 41 with SEs ± 6.2 there is no point in putting in the 3"d" values.

p.80 The test "High v Low" has not been carried out on Totals, and may give the same result as that for Live Herbage. It is not necessary to have a significant F for the overall treatment comparison before carrying out such a test.

Appendix IIIb. Misprint in "O v Rest" line of Table.

A. Blaney.

EXPERIMENTAL SUMMARY.

The tolerance of four pasture species to treatment with dalapon in autumn was studied on single species swards. Perennial ryegrass was found to be the most tolerant species at all rates of application, followed in order of susceptibility by white clover, cocksfoot and browntop.

2 lb. per acre caused moderate damage to perennial ryegrass and severe damage to white clover and cocksfoot during winter. Considerable mortality resulted with browntop, but all species recovered vigorously in early spring.

4 lb. per acre completely killed all browntop and left only a few survivors of cocksfoot. Perennial ryegrass and white clover were severely damaged and many plants failed to recover. Regrowth from surviving plants was less vigorous than at 2 lb. per acre.

6 and 8 lb. per acre gave equally efficient results with all species. Only a few isolated plants of perennial ryegrass and white clover survived treatment. The continued inhibition of growth of surviving white clover plants was observed.

Environmental and sward factors influencing the results are discussed. Frost damage was found to be of considerable importance in the recovery of treated plants.

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CHAPTER I.

General Introduction.

One of the more important developments of recent years in New Zealand agriculture has been the introduction of herbicides selective against grass species. Originally intended for the control of grass weeds in arable crops these herbicides have proved capable of being utilized in many other aspects of farming practice, the most spectacular of which is 'chemical ploughing'. This popular name has been coined to describe the process whereby pastures may be improved with the aid of herbicides on land which cannot successfully be cultivated by conventional means. Extension of this technique to land which is only accessible to the aeroplane is being investigated by Blackmore (1958) and the preliminary reports suggest that 'chemical ploughing' may be a useful aid to aerial top-dressing and oversowing.

Every new development, however striking, must satisfactorily blend with ^{or} replace existing practice before it becomes generally accepted. Many problems of practical application require solution before recommendations can be made to farmers and these are at present under investigation in field trials throughout the country.

At the same time a thorough knowledge of the properties of the herbicides and the factors affecting their efficiency under a wide range of field conditions is essential. Where herbicides are applied to a mixed population of plants, as in a pasture, it is desirable to know, within fairly narrow limits, the tolerance of each constituent species.

The experiments reported in this thesis were undertaken to investigate the susceptibility of some common pasture species to dalapon, *the most important of the selective grass-killing herbicides involved in 'chemical ploughing' and associated techniques.

* see Appendix I.

CHAPTER II

REVIEW OF LITERATURE

This review will be presented in three sections as follows:

PART I Aspects of the utilization of dalapon in New Zealand.

PART II Aspects of plant and species susceptibility to dalapon.

PART III The tolerance of New Zealand pasture species to dalapon.

A list of common names and chemical abbreviations of herbicides mentioned in the review of literature is presented in Appendix I.