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A STUDY OF THE VEGETATIVE AND REPRODUCTIVE MORPHOLOGY OF
GRASSLANDS HUIA WHITE CLOVER (*Trifolium repens* L.) WITH
EMPHASIS ON THE EFFECTS OF DEFOLIATION AND PARAQUAT
ON SEED YIELD AND QUALITY

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Depicting vegetative and floral parts of white clover plant.

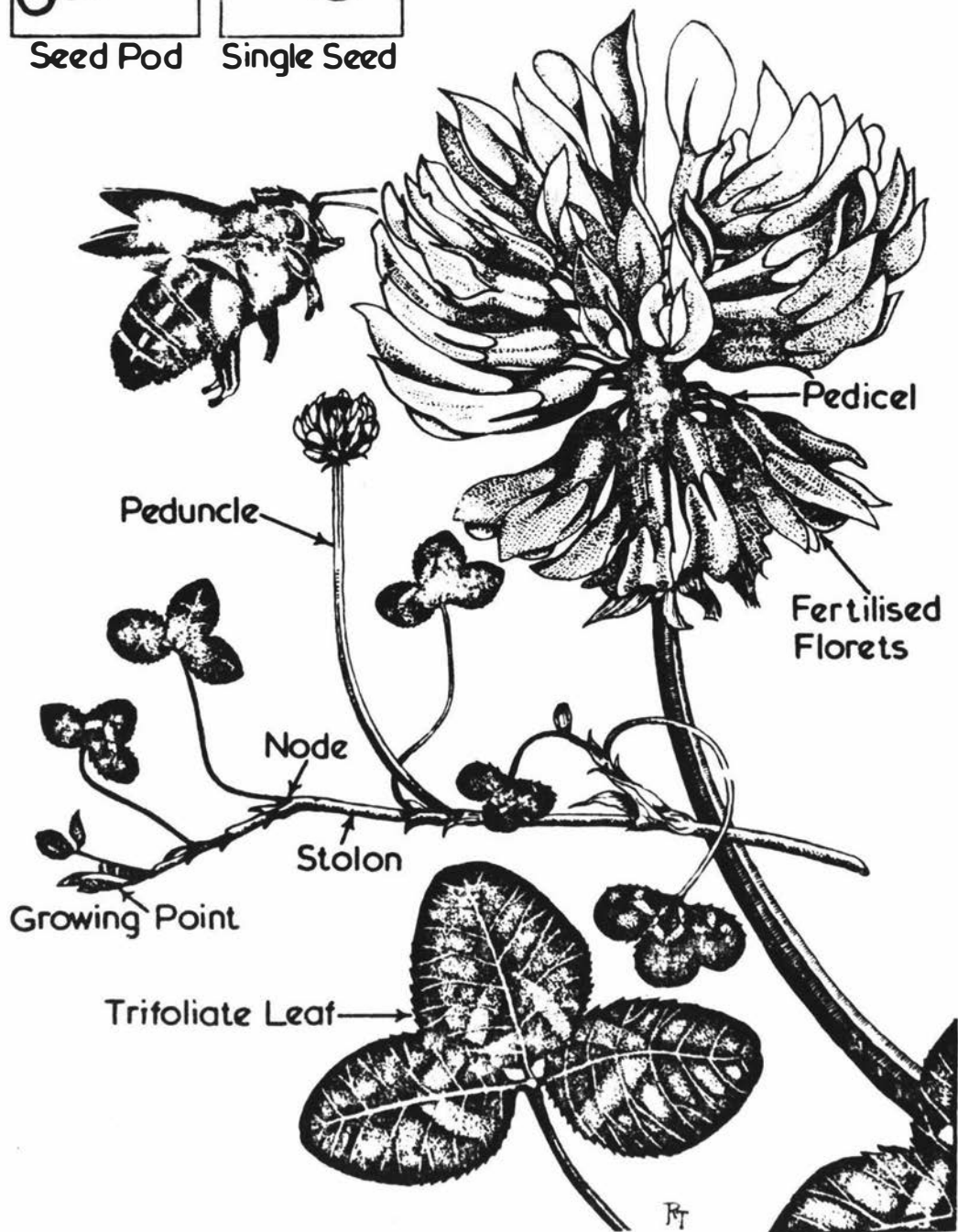


Seed Pod



Single Seed

Inflorescence



ABSTRACT

The present study examined the effect of management systems, particularly closing date and paraquat application, on the vegetative and reproductive morphology of 'Grasslands Huia' white clover (Trifolium repens L.) over two successive years in a field mixed (grass and clover) sward situation. More detailed studies involving two different genotypes of 'Grasslands Huia' white clover grown in monoculture were also carried out to examine the effects of cutting and paraquat application.

The mixed sward studies clearly showed that November closing dates resulted in highest seed yields. In grass/clover swards the closing of crops in November accompanied by paraquat spraying to remove grass competition either in mid October or at closing, enhanced seed yield. Later grazing and spraying was deleterious to seed yield unless climatic conditions allowed continued vegetative growth into December. In this latter case spraying in November and closing in December gave high seed yields. Treatments involving closing in September and October and spraying 30 days before, at closing or 30 days after closing, always gave less seed yield than November treatments sprayed 30 days before or at closing time.

Closing time and spraying time had a marked effect on seed yield components. The most consistent and major effect of closing and spraying treatments in the two mixed sward experiments was on inflorescence numbers. Other components such as seed set, seed weight, and floret numbers were not consistently influenced by management but did vary according to environmental conditions.

Studies on the effects of cuttings and paraquat application on plant structure and on seeding potential and yield of 'Grasslands Huia' white clover clearly showed that there is a partitioning between vegetative growth and reproductive development. The vegetative process was characterised by a high percentage of the nodes on main stolons forming lateral stolons in the winter and early spring. Reproductive development in late spring and summer showed that approximately 80% of inflorescences were formed on main stolons. Highest inflorescence numbers were produced from nodes formed in October and November, although floral initiation started during late winter (August). The two genotypes used in this study showed considerable variation in relation to reproductive development. Differences of 47% in inflorescence numbers, 25% in seeds per floret and 13% in seed weight were observed between genotypes.

The effects of defoliation by cutting involved a reduction in stolon elongation and a general increase in lateral stolon production, particularly when terminal buds were also removed. Both light and heavy cutting treatments resulted in seed yields which were 70 to 90 kg/ha less than the 657 kg/ha produced by uncut plants. The effect of paraquat application was also detrimental to seed yield, mainly through a direct effect on white clover morphology. Although paraquat reduced the amount of lateral branching on the main stolon the destruction of stolon tissue by the herbicide reduced plant recovery and resulted in a seed yield of only 392 kg/ha compared with 657 kg/ha from unsprayed plants. This effect was most pronounced in pure swards of white clover and was less obvious when the grass component of a mixed sward provided some protection for the white clover by reducing the extent of direct contact with the herbicide.

Some potential areas for future research and the potential for white clover seed production in Colombia are also discussed.

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CONTENTS

	PAGE
Abstract	
Acknowledgements	ii
List of Tables	viii
List of Figures	xii
List of Plates	xiv
List of Appendices	xv
INTRODUCTION	1
CHAPTER I - REVIEW OF LITERATURE	4
A - <u>General Description of White Clover</u>	4
B - <u>Vegetative Morphology and Growth</u>	6
1 - Stolon Structure and Growth	6
2 - Branching	9
3 - Leaf and Petiole Growth	10
4 - Root Growth	11
C - <u>Reproductive Morphology and Growth</u>	12
1 - Inflorescence Structure and Growth	12
2 - Factors which affect Inflorescence Development	13
D - <u>Effect of Flowering on Vegetative Growth</u>	16
E - <u>Seed Structure and Development</u>	16
F - <u>Seed Yield Components and Seed Quality</u>	20
G - <u>Seed Crop Management</u>	23
1 - Seed Production	23
2 - Effect of Defoliation on Vegetative Growth, Reproductive Growth and Seed Production	28
H - <u>Paraquat Properties</u>	32
CHAPTER II - EFFECTS OF CLOSING DATE AND TIMING OF PARAQUAT APPLICATION ON VEGETATIVE AND REPRODUCTIVE GROWTH OF HUIA IN MIXED SWARDS	33
A - <u>Field Experiment 1982 - 1983</u>	33
1 - Introduction	33

	PAGE
2 - Materials and Methods	33
a - Experimental Site and Field Procedures	33
b - Plant Measurements and Statistical Analysis	37
3 - Results	39
a - Effect of Treatments on Dry Weight of grass and Dead Matter	39
b - Effect of Treatments on White Clover Dry Weight	42
c - Effect of Treatments on Clover Leaf Area Index	45
d - Effect of Treatments on Number of Nodes and Terminal Buds	47
e - Effect of Treatments on the Date of Peak Flowering	50
f - Effect of Treatments on Seed Yield and Yield Components	50
g - Effect of Treatments on Seed Quality	61
h - Relationship Between Seed Yield and Yield Components	65
 B - <u>Field Experiment 1983 - 1984</u>	 67
1 - Introduction	67
2 - Materials and Methods	67
a - Experimental Site and Field Procedure	67
b - Plant Measurements and Statistical Analysis	70
3 - Results	70
a - Effect of Treatments on Grass and Dead Matter Dry Weight	70
b - Effect of Treatments on White Clover Dry Weight	72
c - Effect of Treatments on White Clover Leaf Area Index and Leaflet Area	75
d - Effect of Treatments on Number of Nodes, Terminal buds and Stolon Length	77
e - Effect of Treatments on Branch Production per Stolon	82
f - Relationship between Vegetative Characters	82
g - Effect of Treatment on the Number of Inflorescences	85
h - Relationship between Inflorescences/m ² and Vegetative Characters	87
i - Effect of Treatments on the Date of Peak Flowering	90

j - Effect of Treatments on the Seed Yield and Yield Components	91
k - Effect of Treatment on Seed Quality	97
l - Relationship between Seed Yield and Yield Components	101
C - <u>Discussion</u>	102
CHAPTER III - STUDY OF THE GROWTH PATTERN OF HUIA AND THE EFFECT OF CUTTING AND PARAQUAT ON ITS REPRODUCTIVE DEVELOPMENT AND SEED YIELD	109
A - <u>The Importance of Plant Structure on Seeding Potential and Yield</u>	109
1 - Introduction	109
2 - Materials and Methods	110
a - Experimental Site and Field Procedures	110
b - Plant Measurements	112
3 - Results	115
a - Vegetative Growth and Development	115
b - The Morphology of Inflorescence Initiation and Development	124
c - Seed Yield and Seed Yield Components	141
4 - Discussion	144
B - <u>Effect of Paraquat Application and Cutting Intensity on Reproductive Growth and Seed Yield</u>	146
1 - Materials and Methods	147
a - Experimental Site and Field Procedures	147
b - Plant Measurements and Statistical Analysis	148
2 - Results	149
a - Effect of Defoliation Treatments on White Clover Vegetative Growth and Development	149
b - Effect of Defoliation Treatments on White Clover Reproductive Growth and Development	158
c - Effect of Defoliation Treatments on White Clover Yield Components and Seed Yield	162
d - Effect of Defoliation Treatments on White Clover Seed Quality	167
3 - Discussion	167

	PAGE
CHAPTER IV - GENERAL DISCUSSION	171
- CONCLUSIONS	179
APPENDICES	183
BIBLIOGRAPHY	208

LIST OF TABLES

TABLE		PAGE
1	Treatments used and their identification 1982/83	37
2	Effect of closing time and paraquat treatments on grass dry weight (g/m^2)	40
3	Effect of closing time and paraquat treatments on dead matter dry weight (g/m^2)	41
4	Effect of closing time and paraquat treatments on white clover dry weight (g/m^2)	43
5	Effect of closing time and paraquat treatments on white clover leaf area index	46
6	Effect on closing time and paraquat treatments on the number of nodes/ dm^2	48
7	Effect of closing time and paraquat treatments on the number of terminal buds/ dm^2	49
8	Effect of closing time and paraquat treatments on the date of peak flowering	51
9	Effect of closing date and time of paraquat application on seed yield per unit area (kg/ha)	52
10	Effect of closing date and time of paraquat application on the total number of inflorescences/ m^2 present at each harvest	55
11	Effect of closing date and time of paraquat application on the number of florets per inflorescence at peak flowering	57
12	Effect of closing date and time of paraquat application on the seed number per floret present at each harvest	58
13	Effect of closing date and time of paraquat application on 1000 seed weight (g) at each harvest	60
14	Correlation coefficients between seed yield (kg/ha) and yield components	66
15	Treatments used and their identification	68
16	Effect of closing date and time of paraquat application on grass dry weight (g/m^2)	71

TABLE	PAGE	
17	Effect of closing date and time of paraquat application on dead matter dry weight (g/m^2)	73
18	Effect of closing date and time of paraquat application on white clover dry weight (g/m^2)	74
19	Effect of closing date and time of paraquat application on leaf area index (m^2/m^2)	76
20	Effect of closing date and time of paraquat application on leaflet area (mm^2)	78
21	Effect of closing date and time of paraquat application on the number of nodes/ dm^2	79
22	Effect of closing date and time of paraquat application on the number of terminal buds/ dm^2	80
23	Effect of closing date and time of paraquat application on the length (mm) of main stolon	81
24	Effect of closing date and time of paraquat application on the number of branches per stolon	83
25	Effect of closing date and time of paraquat application on the strength of association between clover dry weight (g/m^2) and some vegetative characters measured every 15 days after the completion of each treatment until harvest	84
26	Effect of closing date and time of paraquat application on the total number of inflorescences/ m^2	86
27	Correlation coefficient for each treatment between inflorescence numbers/ m^2 emerged at different time of the year and several vegetative characters of white clover plants	87
28	Effect of closing date and time of paraquat application on the date of peak flowering	90
29	Effect of closing date and time of paraquat application on seed yield (kg/ha)	91
30	Effect of closing date and time of paraquat application on the number of inflorescences/ m^2 at harvest	93

TABLE	PAGE	
31	Effect of closing date and time of paraquat application on the number of florets per inflorescence at harvest	94
32	Effect of closing date and time of paraquat application on the number of seeds per floret at harvest	95
33	Effect of closing date and time of paraquat application on 1000 seed weight (g)	96
34	Effect of closing date and time of paraquat application on normal seedling percentage	97
35	Effect of closing date and time of paraquat application on abnormal seedling percentage	98
36	Effect of closing date and time of paraquat application on hard seed percentage	99
37	Effect of closing date and time of paraquat application on dead seed percentage	100
38	Correlation coefficients between seed yield and yield components from plots closed at different dates and sprayed with paraquat	101
39	Total number of nodes, lateral stolons, lateral branches, axillary buds, and inflorescences present in February at the nodes, which emerged from terminal buds of main stolons from July to January	119
40	Changes in petiole and peduncle length, inflorescence size, and number of ovules per floret with the time of the year	139
41	Variation in yield components and seed yield between two 'Grasslands Huia' genotypes	141
42	Treatments used and their identification	148
43	Effect of defoliation treatments on the number of nodes emerging from the terminal bud per month on a main stolon from November to January	150
44	Effect of defoliation treatments on the increment in length (mm) of a main stolon during each month from November to January	151

TABLE	PAGE	
45	Effect of defoliation treatments on the number of leaf primordia per terminal bud	154
46	Effect of defoliation treatments on the number of lateral stolons present in February at nodes which emerged from terminal buds of main stolons during each month from November to January	156
47	Effect of defoliation treatments on the number of lateral branches present in February at nodes which emerged from terminal buds of main stolons during each month from November to January	157
48	Effect of defoliation treatments on the number of rooted nodes present in February at nodes which emerged from terminal buds of main stolons during each month from November to January	158
49	Effect of defoliation treatments on the number of inflorescences present in ten terminal buds of main stolons every 15 days from November to January	159
50	Effect of defoliation treatments on the time of inflorescence initiation in ten terminal buds of main stolons every 15 days from November to January.	160
51	Effect of defoliation treatments on the total number of inflorescences emerged on main stolons plus lateral stolons, present in February at nodes which emerged from terminal buds during each month from November to January	161
52	Effect of defoliation treatments on white clover yield components	164
53	Effect of defoliation treatments on white clover seed yield (kg/ha)	166
54	Effect of defoliation treatments on white clover seed quality	168

LIST OF FIGURES

FIGURE		PAGE
1	Vegetative and floral parts of a white clover plant	8
2	a) External and internal morphology of a legume seed and b) Anatomical features of a legume seed coat	17
3	Trial layout. Field experiment 82/83	35
4	Effect of closing time on the percentage of normal seedlings, abnormal seedlings, hard seed, dead seed and viable seed at each harvest	62
5	Effect of paraquat spraying time on the percentage of normal seedlings, abnormal seedlings, hard seed, dead seed and viable seed at each harvest	63
6	Trial layout. Field experiments 83/84	69
7	Effect of closing time and paraquat treatments on seed yield (g/m^2) Two year experiments	106
8	Vegetative and floral organs of a white clover plant	111
9	Number of nodes emerging from the terminal bud on main stolons per month	116
10	Monthly incremental length increase in main stolons (July to January)	117
11	Total number of lateral stolons present in February at nodes which emerged from terminal buds on main stolons from July to January	118
12	Number of lateral stolons of different lengths present in February at nodes which emerged from terminal bud of twenty main stolons from July to January	121
13	Number of lateral branches and axillary buds present in February at nodes which emerged from terminal buds of main stolons from July to January	122
14	Percentage of rooted nodes present in February at nodes which emerged from terminal buds of main stolons from July to January	123

FIGURE		PAGE
15	Diagrammatic representation of stages of inflorescence and node development in white clover relative to distance from stolon apex under natural spring conditions. Thomas (1981)	125
16	Estimated time of inflorescence initiation in 10 terminal buds on main stolon from July to February	132
17	Number of inflorescences present in ten terminal buds on main stolons from July to February	133
18	Number of inflorescences emerged on main stolons and lateral stolons from September to January	135
19	Number of white inflorescences present per unit area	137
20	Number of white inflorescences produced in paraquat and cutting treatments	163

LIST OF PLATES

PLATE		PAGE
1	Knapsack sprayer used for paraquat application	34
2	Portable shearing machine used in cutting treatments	36
3	Damage caused by paraquat in white clover leaves one week after spraying	89
4	Damage caused by paraquat application to white clover inflorescence one week after spraying	89
5	Scanning electronmicrograph showing the morphological appearance of a leaf primordium (x 550)	126
6	Scanning electron micrograph showing flower initiation (x 430)	127
7	Scanning electron micrograph showing floret initiation (x 300)	128
8	Stage of growth of an inflorescence at early emergence (x 60)	130
9	Stages of development of inflorescences after emergence	130
10	Differences in flowering density between the two genotypes in December 1984	136
11	Ovules present in an unfertilised floret (x 60)	140
12	X-ray photograph showing changes in the number of ovules forming seeds in individual florets	142
13	Effect of heavy cut and paraquat treatments on main stolons of white clover 7 days after treatment application	152
14	Recovery growth of white clover stolon after paraquat application	155

LIST OF APPENDICES

APPENDICES	PAGE
1 Soil analysis of the experimental field	183
2 Basic weather data for Palmerston North; mean values for each month over the experimental period 1982 - 1983	184
3 Effect of closing time and paraquat treatment on soil moisture content 1982-1983	185
4 Effect of closing time and paraquat treatment on normal seedling percentage 1982-1983	186
5 Effect of closing time and paraquat treatments on abnormal seedling percentage 1982-1983	187
6 Effect of closing time and paraquat treatments on hard seed percentage 1982-1983	188
7 Effect of closing time and paraquat treatments on dead seed percentage 1982-1983	189
8 Effect of closing time and paraquat treatments on viable seed percentage 1982-1983	190
9 Basic weather data for Palmerston North: mean values for each month over the experimental period 1983-1984	191
10 Effect of closing time and paraquat treatments on soil moisture content 1983 - 1984	192
11 Variation in number of florets in ten inflorescences at harvest 1983-1984	193
12 Basic weather data for Palmerston North: mean values for each month over the experimental period 1984 - 1985	194
13 Increase in length of main stolons from July to January 1984-1985	195
14 Number of lateral stolons of different sizes present in February on main stolons from July to January 1984-1985	196
15 Percentage of rooted nodes present in February at nodes which emerged from terminal buds of main stolons from July to January 1984-1985	197

APPENDICES		PAGE
16	Estimated time of initiation of inflorescences in 10 terminal buds of main stolons from July to January 1984-1985	198
17	Number of inflorescences present in ten terminal buds on main stolons from July to January 1984-1985	199
18	Number of inflorescences on main and lateral stolons, present in February, on nodes which emerged from terminal buds on main stolons from September to January 1984-1985	200
19	Number of white inflorescences per unit 1984-1985 area	201
20	Changes in petiole and peduncle length, inflorescence size, number of ovules per ovary, and seed numbers per pod in Genotype I and Genotype II 1984-1985	202
21	Effect of defoliation on the number of inflorescences per main stolon present in February at nodes which emerged from terminal buds of main stolons from November to January 1984-1985	203
22	Effect of defoliation on the number of inflorescences on lateral stolons present in February at nodes which emerged from terminal buds on main stolons from November to January 1984-1985	204
23	Effect of defoliation on the number of florets per inflorescence 1984-1985	205
24	Effect of defoliation on the number of ovules per ovary 1984-1985	206
25	Effect of defoliation on the number of seeds per floret 1984-1985	207