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A STUDY OF THE EFFECTS OF TEMPERATURE AND
PHOTOPERIOD ON VEGETATIVE GROWTH AND SEED
PRODUCTION OF LEAF LETTUCE (LACTUCA SATIVA L.)

A thesis presented in partial fulfilment
of the requirement for the
Degree of Doctor of Philosophy
in Seed Technology at
Massey University

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1985



LETTUCE SEED HEAD

ABSTRACT

Three leaf lettuce (Lactuca sativa L.) cultivars, Thai, Grand Rapids and Slobolt were grown in a controlled environment at either 25/15°C or 30/20°C day/night temperatures and at 10, 12 or 14 hours daylength. Leaf fresh weight, dry weight, leaf area and leaf number all increased with increasing temperature and photoperiod. Slobolt produced a higher vegetative yield than Thai and Grand Rapids. Long days and high temperatures hastened stem elongation. Flowering in Thai and Grand Rapids was mainly influenced by high temperature whereas Slobolt required both high temperatures and long days. Slobolt however, was considerably delayed in bolting and flowering compared with the other two cultivars.

Lettuce plants showed two definite flowering peaks over a 50-day flowering period. Slobolt produced only one peak at 25/15°C due to its slow bolting character.

Seed development studies were carried out on plants grown in both the 25/15°C and 30/20°C temperature regimes and at 12 hours daylength. The higher temperature regime hastened seed maturity, germination and shattering. Lettuce seed reached physiological maturity 11 days after anthesis at 30/20°C and 13 days after anthesis at 25/15°C, when the seed head had just begun to turn brown-green. Germination capacity also reached its maximum at this stage. Shattering however, occurred about two days after seed maturity at 20% moisture content at 30/20°C and 4 - 5 days later at 25/15°C.

The three lettuce cultivars used in this study produced seed successfully in all treatments. Optimum time of harvest was found to occur when the majority of seed heads had turned slightly brown in colour and was also reduced by higher

temperatures and longer daylengths due to earlier bolting and flowering. Highest seed yield was obtained under long days (14 hours). Grand Rapids produced higher seed yields than Thai and Slobolt.

High seed yield was related to increased branch and flower numbers, percentage of seed set or seed numbers per head and time of harvest. Good seed set was obtained only under longer daylengths at high temperature while at 25/15°C, daylength was relatively unimportant. Final seed germination was unaffected by temperature or daylength. Practical application of the results which are relevant to Thailand conditions are discussed.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to Dr M J Hill for his supervision, understanding and kind encouragement throughout my study and especially for his constructive criticism, patience in interpreting the results and correction of my English. Without his help, this work would not have been possible.

Sincere thanks are also due to:

Professor B R Watkin, for his valuable suggestions, constructive criticism, help in discussing the research problems and also reading the manuscript.

Mr I J Warrington, Plant Physiology Division, DSIR for his constant help and in providing information and willingly going through the draft of the thesis.

Professor T W Tibbitts, Horticulture Department, University of Wisconsin, for his interest and advice at the beginning of the study.

Mrs D E M Meech and staff of Seed Technology Centre for their friendly encouragement and all the technical help. I owe a great debt to them.

Dr D C Morgan and staff of the Climate Laboratory, DSIR for their help and maintenance of the controlled environment rooms used in this study.

Professor R J Townsley and Dr I L Gordon for their advice in statistical problems.

Mr R C Seddon for his help in computing the data and also reading the manuscript.

Mr L Maiden and staff of Central Photographic Unit for their photographic work.

Mrs A M Davies and Mrs F S Wicherts for their patience in typing this thesis. Mr G Halligan for the illustrations.

The New Zealand Government for providing the Scholarship which enabled me to undertake this study.

I especially want to thank my husband and children for their understanding. Mrs K. McDonald for her kindness in providing me with a real home during my stay in New Zealand. Sunanta, my friend for her moral support and encouragement.

CONTENTS

	Page
Abstract	iii
Acknowledgements	v
List of Tables	x
List of Figures	xi
List of Plates	xii
List of Appendices	xiv
INTRODUCTION	1
CHAPTER 1 REVIEW OF LITERATURE	4
1. General description of lettuce.....	5
2. Temperature and photoperiod effects on growth and development.....	7
3. Temperature and photoperiod effects on flowering.	8
4. Temperature and photoperiod interactions with vernalization on flowering.....	11
5. Seed quality and germination.....	12
6. Seed production practices	16
7. Seed development.....	22
CHAPTER 2 PRELIMINARY STUDY	26
MATERIALS AND METHODS	28
RESULTS AND DISCUSSION	30

CHAPTER 3	VEGETATIVE GROWTH	40
	MATERIALS AND METHODS	41
	RESULTS AND DISCUSSION	45
1.	Plant fresh weight.....	45
2.	Plant dry weight.....	50
3.	Leaf area.....	53
4.	Leaf number.....	56
5.	Stem length.....	59
6.	Number of shoots.....	64
CHAPTER 4	REPRODUCTIVE GROWTH, FLORAL INITIATION, FLOWERING PATTERN AND SEED PRODUCTION	66
	MATERIALS AND METHODS	67
	RESULTS AND DISCUSSION	75
1.	Flowering pattern.....	75
2.	Seed production.....	83
CHAPTER 5	SEED MATURATION AND VIABILITY	88
	MATERIALS AND METHODS	89
	RESULTS AND DISCUSSION	91
1.	Changes in seed weight.....	91
2.	Moisture contents.....	92
3.	Seed shattering.....	95
4.	Seed colour changes.....	102
5.	Germination and viability.....	103

CHAPTER 6	SEED YIELD AND QUALITY	109
	MATERIALS AND METHODS	110
	RESULTS AND DISCUSSION	112
1.	Height.....	112
2.	Branch number.....	114
3.	Seed yield.....	116
4.	Germination.....	121
5.	Seed weight.....	123
CHAPTER 7	GENERAL DISCUSSION AND CONCLUSION	126
BIBLIOGRAPHY		140
APPENDICES		156

TABLES

<u>Table</u>		<u>Page</u>
2.1	Varietal characteristics in a range of different leaf lettuce cultivars	29
3.1	Effect of temperature, photoperiod and cultivar on fresh weight at each harvest	46
3.2	Effects of temperature, photoperiod and cultivar on fresh weight at each harvest	51
3.3	Effects of temperature, photoperiod and cultivar on leaf area at each harvest	54
3.4	Effects of temperature, photoperiod and cultivar on leaf number at each harvest	57
3.5	Effects of temperature, photoperiod and cultivar on stem length at each harvest	60
3.6	Number of shoots 40 days after sowing	65
4.1	Effects of temperature, photoperiod and cultivar on lettuce flowering	76
4.2	Effects of temperature, daylength and cultivar on floret numbers, seed numbers per head and percentage of seed set at each peak flowering	84
6.1	Effects of temperature, daylength and cultivar on plant height at each peak flowering	113
6.2	Effects of temperature, daylength, cultivar and harvest time on branch numbers	115
6.3	Effects of temperature, daylength, cultivar and harvest time on seed yield	117
6.4	Effects of temperature, daylength, cultivar and harvest time on germination percentage	122
6.5	Effects of temperature, daylength, cultivar and harvest time on seed weight	124

FIGURES

<u>Figure</u>		<u>Page</u>
3.1	Number of green lettuce leaves for each cultivar at different temperature and daylength	58
3.2	Stem length of three lettuce cultivars at each temperature and daylength	61
4.1	Diagrammatic representation of the inflorescences and branching of leaf lettuce	74
4.2	Days to bolting, anthesis and peak flowering	77
4.3	Flowering pattern of three leaf lettuce cultivars under different daylength at 25/15°C	80
4.4	Flowering pattern of three leaf lettuce cultivars under different daylengths at 30/20°C	81
5.1	Changes in physiological components during seed development at 25/15°C	93
5.2	Changes in physiological components during seed development at 30/20°C	94
5.3	Percentage of germination (normal seedling) and seed viability at 30/20°C	104
5.4	Percentage of germination (normal seedling) and seed viability at 25/15°C	105
6.1	Seed yield at each daylength, temperature and time of harvest in three lettuce cultivars	118

PLATES

<u>Plate</u>		<u>Page</u>
2.1	Black seeded lettuce (Thai cv.) a) in the field b) as presented for the market	27
2.2	Typical Thai dishes prepared for the table	31
2.3	A plant of cultivar a) Thai b) Grand Rapids at 60 d after sowing	32
2.4	A plant of cultivar a) Slobolt b) Waldmanmn's Green at 60 d after sowing	34
2.5	A plant cultivar a) Deep Red b) Prize head at 60 d after sowing	35
2.6	A plant cultivar a) Brazil 48 b) Brazil 221 at 60 d after sowing	36
2.7	A plant of cultivar a) Summer Queen b) Tania at 60 d after sowing	37
2.8	A plant of cv. Salad Bowl at 60 d after sowing	39
3.1	Visual appearance of lettuce plants at 40 d after sowing	49
3.2	Stem and shoot development characters in three leaf lettuce cultivars under 10 and 14 h daylengths at 25/15°C and 30/20°C	62
4.1	Floral initiation	68
4.2	Flower development	69
4.3	Lettuce flower head	70
4.4	Lettuce seed	71
4.5	An individual lettuce plant inflorescence with a cluster of seed heads in various stages of development	73
4.6	Individual seed heads	73

<u>Plate</u>		<u>Page</u>
5.1	Tagged flower of leaf lettuce cv. Grand Rapids a few hours after anthesis	90
5.2	Changes in seed head and seed colour at 25/15°C in	
	a) Thai	96
	b) Grand Rapids	97
	c) Slobolt	98
5.3	Changes in seed head and seed colour at 30/20°C in	
	a) Thai	99
	b) Grand Rapids	100
	c) Slobolt	101
5.4	Examples of the types of abnormal seedlings found in seeds removed from lettuce plants during the stage of seed development	108

APPENDICES

Appendix

1. Climatic data at Pakchong Horticultural Research Station
2. Climatic data at Royal Angkhang Highland Research Station
3. The levels of photosynthetic radiation of each treatment in controlled environment rooms under different temperature and daylength treatments
4. Climate Lab - modified half-strength Hoagland's nutrient
5. Relative growth rates of plant dry weight (RGR) and leaf area (RLGR)
6. Temperature, daylength and cultivar effects on fresh weight (g/plant)
7. Temperature, daylength and cultivar effects on dry weight (g/plant)
8. Temperature, daylength and cultivar effects on leaf area (cm²/plant)
9. Temperature, daylength and cultivar effects on seed fertility.
10. 100 seed fresh weight (mg) at different days after anthesis
11. 100 seed dry weight (mg) at different days after anthesis
12. Moisture content (%) at different days after anthesis
13. Germination percentage (normal seedlings) at different days after anthesis
14. Germination percentage (abnormal seedlings) at different days after anthesis
15. Seed viability at different days after anthesis
16. Temperature, daylength and cultivar effects on seed yield (g/plant)
17. Temperature, daylength and cultivar effects on germination percentage
18. Temperature, daylength and cultivar effects on 1000 seed dry weight (mg)