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PREVIEW

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**Effect of various levels of nitrogen and sulfur on yield, color,
ascorbic acid, and sensory attributes of hydroponically grown
'Grand Rapids' leaf lettuce**

McCluskey, Melinda McVey, Ph.D.

The University of Nebraska - Lincoln, 1994

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PREVIEW

**EFFECT OF VARIOUS LEVELS OF NITROGEN AND SULFUR ON YIELD,
COLOR, ASCORBIC ACID, AND SENSORY ATTRIBUTES OF
HYDROPONICALLY GROWN 'GRAND RAPIDS' LEAF LETTUCE**

by

Melinda McVey McCluskey

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Horticulture & Forestry

Under the Supervision of Professor Ellen T. Paparozzi

Lincoln, Nebraska

June, 1994

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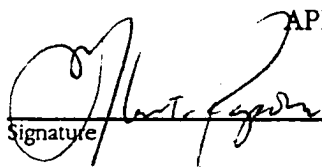
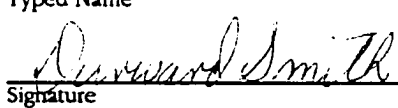
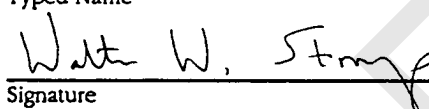
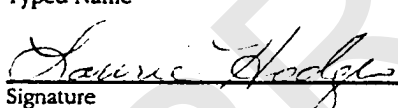

ACID, AND SENSORY ATTRIBUTES OF HYDROPONICALLY GROWN

'GRAND RAPIDS' LEAF LETTUCE

BY

Melinda McVey McCluskey

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**Effect of various levels of nitrogen and sulfur on
yield, color, ascorbic acid, and sensory attributes of
hydroponically grown 'Grand Rapids' leaf lettuce**

Melinda McVey McCluskey, Ph.D.

University of Nebraska, 1994

Advisor: Ellen T. Paparozzi

The importance of nitrogen and sulfur as essential nutrients in the growth and development of plants is well documented. Nitrate concentration is an important criterion for food quality, and sulfur concentration affects the nutritive value and organoleptic properties of vegetables. Groundwater contamination due to nitrogen fertilizers is a major concern in agriculture. This research was done to determine if nitrogen supplied to lettuce could be reduced by addition of sulfur and what effect altering the nutrient balance would have on quality.

The first series of experiments was designed to modify a hydroponic system for 'Grand Rapids' leaf lettuce production. The system was used to screen twenty-four nitrogen-sulfur combinations from which treatments for further experiments would be selected. The intent was also to determine if a reduction in the number of treatments per block using an incomplete factorial design would yield results equivalent to a complete factorial design.

Eight treatment combinations were selected from the preliminary screening for further study. The purpose was to determine the effect of various levels of nitrogen and sulfur supplied on: fresh weight, dry weight, leaf nitrogen content, leaf sulfur content, ascorbic acid content, color, and sensory attributes of leaf lettuce.

The incomplete design failed to yield results equivalent to the complete factorial design. Leaf nitrogen content increased as nitrogen supplied increased, but declined at 240 ppm nitrogen. Leaf sulfur content increased with increased application of sulfur and nitrogen. Nitrogen supplied affected color such that plants receiving 240 ppm nitrogen were a darker, duller green, and plants receiving 30 ppm nitrogen were a lighter, vivid yellow-green. Ascorbic acid content increased as nitrogen supplied increased. Sulfur had no detectable effect on ascorbic acid content. Differences in sensory evaluation were due to nitrogen and sulfur supplied. Sulfur and nitrogen supplied had similar effects on winter and spring grown lettuce, but the magnitude of difference was greater in the spring.

*Dedicated to my parents,
Nancy and Gary McVey,
who taught me to dream
and whose love and encouragement
enabled me to achieve my dreams.*

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TABLE OF CONTENTS

Chapter	Page
1. Literature Review	1
Introduction	1
Lettuce	2
Nitrogen	4
Sulfur and the Nitrogen-Sulfur Interaction	12
Color	23
Ascorbic Acid	27
Sensory Evaluation	30
Literature Cited	35
2. Preliminary Lettuce Experiments	44
Experiment 1, Fall 1990	44
Materials and Methods	44
Qualitative Results and Discussion	48
Quantitative Results and Discussion	48
Experiment 2, Winter 1991	51
Materials and Methods	51
Qualitative Results and Discussion	52
Quantitative Results and Discussion	53
Experiment 3, Spring 1991	59
Materials and Methods	59

	Qualitative Results and Discussion	60
	Quantitative Results and Discussion	61
	Conclusions	70
	Literature Cited	73
3.	Experiments 4 and 5	133
	Introduction	133
	Materials and Methods	134
	Qualitative Results and Discussion	139
	Quantitative Results and Discussion	141
	Conclusions	154
	Literature Cited	156
4.	Summary with Conclusions and Recommendations	191

LIST OF FIGURES

Figure		Page
I-1.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 1 (all data) . .	74
I-2.	Response surface graph for fresh weight of 'Grand Rapids' leaf lettuce. Experiment 1 (all data).	75
I-3.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	76
I-4.	Response surface graph for fresh weight of 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	77
I-5.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 1 (two partial blocks).	78
I-6.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 1 (all data). . .	79
I-7.	Response surface graph for dry weight of 'Grand Rapids' leaf lettuce. Experiment 1 (all data).	80
I-8.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	81
I-9.	Response surface graph for dry weight of 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	82
I-10.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 1 design 2 (two partial blocks).	83
I-11.	Nitrogen content in 'Grand Rapids' leaf lettuce. Experiments 1 (all data).	84
I-12.	Response surface graph for nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 1 (all data).	85
I-13.	Nitrogen content in 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	86
I-14.	Response surface graph for nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	87

I-15.	Nitrogen content in 'Grand Rapids' leaf lettuce. Experiment 1 design 2 (two partial blocks).	88
I-16.	Sulfur content in 'Grand Rapids' leaf lettuce. Experiment 1 (all data).	89
I-17.	Sulfur content in 'Grand Rapids' leaf lettuce. Experiment 1 design 1 (two complete blocks).	90
I-18.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	91
I-19.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	92
I-20.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks)	93
I-21.	Response surface graph for fresh weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	94
I-22.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	95
I-23.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	96
I-24.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	97
I-25.	Response surface graph for dry weight of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	98
I-26.	Leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	99
I-27.	Leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	100
I-28.	Leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	101
I-29.	Response surface graph for leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	102

I-30.	Leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	103
I-31.	Leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	104
I-32.	Leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	105
I-33.	Response surface graph for leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	106
I-34.	Hue angles for 'Grand Rapids' leaf lettuce. Experiment 2 (all data). . .	107
I-35.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	108
I-36.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 2 (all data).	109
I-37.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	110
I-38.	Hue angle for 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	111
I-39.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 2 design 1 (two complete blocks).	112
I-40.	Hue angle for 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	113
I-41.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	114
I-42.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	115
I-43.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 3 (all data).	116
I-44.	Response surface graph for fresh weight of 'Grand Rapids' leaf lettuce. Experiment 3 (all data).	117

I-45.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (two complete blocks).	118
I-46.	Response surface graph for fresh weight of 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (two complete blocks).	119
I-47.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 3 design 2 (two partial blocks).	120
I-48.	Hue angle for 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (all data).	121
I-49.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 3 (all data).	122
I-50.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 3 (all data).	123
I-51.	Hue angle for 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (two complete blocks).	124
I-52.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (two complete blocks).	125
I-53.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 3 design 1 (two complete blocks).	126
I-54.	Hue angle for 'Grand Rapids' leaf lettuce. Experiment 3 design 2 (two partial blocks).	127
I-55.	Chroma for 'Grand Rapids' leaf lettuce. Experiment 3 design 2 (two partial blocks).	128
I-56.	Color lightness for 'Grand Rapids' leaf lettuce. Experiment 3 design 2 (two partial blocks).	129
I-57.	Plot of factor 2 (visual) * factor 1 (flavor).	130
I-58.	Plot of factor 2 (visual) * factor 3 (texture).	131
I-59.	Plot of factor 3 (texture) * factor 1 (flavor).	132
II-1.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 4.	159

II-2.	Response surface for fresh weight of 'Grand Rapids' leaf lettuce Experiment 4.	160
II-3.	Fresh weight of 'Grand Rapids' leaf lettuce. Experiment 5.	161
II-4.	Response surface for fresh weight of 'Grand Rapids' leaf lettuce Experiment 5 (excluding 120 ppm N treatments).	162
II-5.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 4.	163
II-6.	Response surface for dry weight of 'Grand Rapids' leaf lettuce Experiment 4.	164
II-7.	Dry weight of 'Grand Rapids' leaf lettuce. Experiment 5.	165
II-8.	Response surface for dry weight of 'Grand Rapids' leaf lettuce. Experiment 5 (excluding 120 ppm N treatments).	166
II-9.	Leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 4. ...	167
II-10.	Response surface for nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 4.	168
II-11.	Leaf nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 5. ...	169
II-12.	Response surface for nitrogen content of 'Grand Rapids' leaf lettuce. Experiment 5.	170
II-13.	Leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 4.	171
II-14.	Response surface for sulfur content of 'Grand Rapids' leaf lettuce. Experiment 4.	172
II-15.	Leaf sulfur content of 'Grand Rapids' leaf lettuce. Experiment 5.	173
II-16.	Response surface for sulfur content of 'Grand Rapids' leaf lettuce. Experiment 5.	174
II-17.	Ascorbic acid content of 'Grand Rapids' leaf lettuce. Experiment 4. ...	175
II-18.	Response surface for ascorbic acid content of 'Grand Rapids' leaf lettuce. Experiment 4.	176
II-19.	Ascorbic acid content of 'Grand Rapids' leaf lettuce. Experiment 5. ...	177

II-20. Response surface for ascorbic acid content of 'Grand Rapids' leaf lettuce. Experiment 5.	178
II-21. Hue angle for 'Grand Rapids' leaf lettuce. Experiment 4.	179
II-22. Hue angle for 'Grand Rapids' leaf lettuce. Experiment 5.	180
II-23. Chroma for 'Grand Rapids' leaf lettuce. Experiment 4.	181
II-24. Chroma for 'Grand Rapids' leaf lettuce. Experiment 5.	182
II-25. Color lightness for 'Grand Rapids' leaf lettuce. Experiment 4.	183
II-26. Color lightness for 'Grand Rapids' leaf lettuce. Experiment 5.	184
II-27. Plot of factor 2 (flavor) * factor 1 (appearance/texture) in experiment 4.	185
II-28. Plot of factor 3 (bitter flavor) * factor 1 (appearance/texture) in experiment 4.	186
II-29. Plot of factor 3 (bitter flavor) * factor 2 (flavor) in experiment 4.	187
II-30. Plot of factor 2 (appearance) * factor 1 (flavor) in experiment 5.	188
II-31. Plot of factor 3 (texture) * factor 1 (flavor) in experiment 5.	189
II-32. Plot of factor 3 (texture) * factor 2 (appearance) in experiment 5. ...	190

LIST OF APPENDICES

Appendix	Page
A1 Nutrients supplied in all experiments (mg/L).	196
A2 Nutrient solution formula supplied in all experiments (g/L).	197
B Preparation of plant material for digestion and detection of total sulfur using ICP-ES.	199
C Total nitrogen analysis using the micro-kjeldahl procedure and the ionanalyzer.	202
D Sensory evaluation form used in experiment 3.	208
E Sensory evaluation form used in experiments 4 and 5.	210
F1 ANOVA for fresh weight of 'Grand Rapids' leaf lettuce in experiment 1 by design.	213
F2 LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 1 (all data).	214
F3 LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 1 design 1 (two complete blocks).	215
F4 LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 1 design 2 (two partial blocks).	216
F5 ANOVA for dry weight of 'Grand Rapids' leaf lettuce in experiment 1 by design.	217
F6 ANOVA for nitrogen content for 'Grand Rapids' leaf lettuce in experiment 1 by design.	218
F7 LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 1 (all data).	219
F8 LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 1 design 1 (two complete blocks).	220
F9 LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 1 design 2 (two partial blocks).	221

F10	ANOVA for sulfur content of 'Grand Rapids' leaf lettuce in experiment 1 by design.	222
F11	ANOVA for color attributes of 'Grand Rapids' leaf lettuce in experiment 1.	223
F12	LSmeans for color attributes of 'Grand Rapids' leaf lettuce in experiment 1 (all data).	224
F13	ANOVA for fresh weight of 'Grand Rapids' leaf lettuce in experiment 2 by design.	225
F14	LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	226
F15	LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (two complete blocks).	227
F16	LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiment 2 design 2 (two partial blocks).	228
F17	ANOVA for dry weight of 'Grand Rapids' leaf lettuce in experiment 2 by design.	229
F18	ANOVA for nitrogen content of 'Grand Rapids' leaf lettuce in experiment 2 by design.	230
F19	LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	231
F20	LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (two complete blocks).	232
F21	LSmeans for nitrogen and sulfur content of 'Grand Rapids' leaf lettuce in experiment 2 design 2 (two partial blocks).	233
F22	ANOVA for sulfur content of 'Grand Rapids' leaf lettuce in experiment 2 by design.	234
F23	ANOVA for the color attributes of 'Grand Rapids' leaf lettuce in experiment 2 by design.	235
F24	LSmeans for color attributes of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	236

F25	ANOVA for hue angle of 'Grand Rapids' leaf lettuce in experiment 2.	237
F26	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	238
F27	ANOVA for chroma of 'Grand Rapids' leaf lettuce in experiment 2 by design.	239
F28	LSmean difference between treatments for chroma of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	240
F29	ANOVA for color lightness of 'Grand Rapids' leaf lettuce in experiment 2 by design.	241
F30	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 2 (all data).	242
F31	LSmeans for the color attributes of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (two complete blocks).	243
F32	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (complete blocks).	244
F33	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (complete blocks).	245
F34	LSmean difference between treatments for chroma of 'Grand Rapids' leaf lettuce in experiment 2 design 1 (complete blocks).	246
F35	LSmeans for the color attributes of 'Grand Rapids' leaf lettuce. Experiment 2 design 2 (two partial blocks).	247
F36	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 2 design 2 (complete blocks).	248
F37	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 2 design 2 (complete blocks).	249
F38	ANOVA for fresh weight of 'Grand Rapids' leaf lettuce in experiment 3 by design.	250
F39	LSmeans for fresh weight of 'Grand Rapids' leaf lettuce in experiment 3 (all data).	251

F40	LSmeans for fresh weight of 'Grand Rapids' leaf lettuce in experiment 3 design 1 (two complete blocks)	252
F41	LSmeans for fresh weight of 'Grand Rapids' leaf lettuce in experiment 3 design 2 (two partial blocks).	253
F42	ANOVA for color attributes of 'Grand Rapids' leaf lettuce in experiment 3 by design.	254
F43	ANOVA for hue angle of 'Grand Rapids' leaf lettuce in experiment 3 by design.	255
F44	LSmeans for the color attributes of 'Grand Rapids' leaf lettuce in experiment 3 (all data).	256
F45	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 3 (all data).	257
F46	ANOVA for Chroma of 'Grand Rapids' leaf lettuce in experiment 3 by design.	258
F47	LSmean difference between treatments for chroma of 'Grand Rapids' leaf lettuce in experiment 3 (all data).	259
F48	ANOVA for color lightness of 'Grand Rapids' leaf lettuce in experiment 3 by design.	260
F49	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 3 (all data).	261
F50	LSmeans for color attributes of 'Grand Rapids' leaf lettuce in experiment 3 design 1 (two complete blocks).	262
F51	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 3 design 1 (complete blocks).	263
F52	LSmean difference between treatments for chroma of 'Grand Rapids' leaf lettuce in experiment 3 design 1 (complete blocks).	264
F53	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 3 design 1 (complete blocks).	265
F54	LSmeans for color attributes of 'Grand Rapids' leaf lettuce in experiment 3 design 2 (two partial blocks).	266

F55	LSmean difference between treatments for hue angle of 'Grand Rapids' leaf lettuce in experiment 3 design 2 (complete blocks).	267
F56	LSmean difference between treatments for chroma of 'Grand Rapids' leaf lettuce in experiment 3 design 2 (complete blocks).	268
F57	LSmean difference between treatments for color lightness of 'Grand Rapids' leaf lettuce in experiment 3 design 2 (complete blocks).	269
F58	ANOVA for sensory attributes of 'Grand Rapids' leaf lettuce in experiment 3.	270
F59	LSmeans for the sensory attributes: appearance, color, and texture of 'Grand Rapids' leaf lettuce in experiment 3.	271
F60	LSmean difference between treatments for sensory attribute appearance of 'Grand Rapids' leaf lettuce in experiment 3.	272
F61	LSmean difference between treatments for sensory attribute color of 'Grand Rapids' leaf lettuce in experiment 3.	273
F62	LSmean difference between treatments for sensory attribute texture of 'Grand Rapids' leaf lettuce in experiment 3.	274
F63	LSmeans for the sensory attributes of 'Grand Rapids' leaf lettuce in experiment 3.	275
F64	LSmean difference between treatments for sensory attribute flavor of 'Grand Rapids' leaf lettuce in experiment 3.	276
F65	LSmean difference between treatments for sensory attribute bitter flavor of 'Grand Rapids' leaf lettuce in experiment 3	277
F66	LSmean difference between treatments for sensory attribute overall acceptance of 'Grand Rapids' leaf lettuce in experiment 3	278
G1	ANOVA for fresh weight of 'Grand Rapids' leaf lettuce in experiments 4 and 5.	280
G2	LSmeans for fresh and dry weight of 'Grand Rapids' leaf lettuce in experiments 4 and 5.	281
G3	ANOVA for dry weight of 'Grand Rapids' leaf lettuce in experiments 4 and 5.	282