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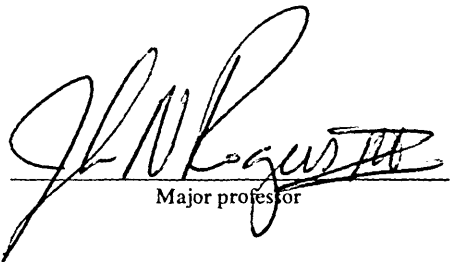
dissertation entitled

The Effects of Plant Growth Regulators on
Kentucky bluegrass (Poa pratensis L.) and
Supina bluegrass (Poa supina Schrad.) in
Reduced Light Conditions
presented by

John C. Stier

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Crop & Soil Sciences


Major professor

Date 6 February 1997

THE EFFECTS OF PLANT GROWTH REGULATORS ON KENTUCKY
BLUEGRASS (*POA PRATENSIS* L.) AND SUPINA BLUEGRASS
(*P. SUPINA* SCHRAD.) IN REDUCED LIGHT CONDITIONS

By

John C. Stier

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Crop and Soil Sciences

1997

ABSTRACT

THE EFFECTS OF PLANT GROWTH REGULATORS ON KENTUCKY BLUEGRASS (*POA PRATENSIS* L.) AND SUPINA BLUEGRASS (*P. SUPINA* SCHRAD.) IN REDUCED LIGHT CONDITIONS

By

John C. Stier

Turfgrass management in reduced light conditions (RLC; < 30% full sunlight) is difficult because turf growth is affected by lack of sufficient light energy. Turf plants in RLC are relatively weak and cannot withstand traffic or other damage due to excessive shoot elongation, reduced tillering, and reduced root growth. In normal light conditions plant growth regulators which inhibit gibberellic acid (GA) biosynthesis are occasionally used on turfgrass to reduce mowing requirements by suppressing shoot growth. The objective of the research was to determine the effects of two GA-inhibitors (flurprimidol and trinexapac-ethyl) on turfgrass in RLC. The primary reason for the research was to develop a set of management strategies to maintain turfgrass in RLC for athletic events, e.g. athletic fields in covered stadia, although the results should be applicable to many turf situations. Three studies were conducted. In the first set of experiments, the effects of flurprimidol were tested at three nitrogen (N) rates (24, 48, and 96 kg ha⁻¹ month⁻¹) on Kentucky bluegrass, with and without traffic, at two levels of RLC (approximately 1-2 and 8 mol photosynthetically active radiation (PAR) day⁻¹). A second study was undertaken to compare the relative shade tolerance of Supina bluegrass (*Poa supina* Schrad.) to Kentucky bluegrass (*P. pratensis* L.) with different combinations of trinexapac-ethyl and foliar-applied iron. In the third study the effects of trinexapac-ethyl

on photosynthesis of Kentucky bluegrass and Supina bluegrass in RLC were assessed.

The effects of trinexapac-ethyl on photosynthesis of Supina bluegrass maintained at low and high N rates (24 and 96 kg ha⁻¹ month⁻¹) were also evaluated. Both flurprimidol and trinexapac-ethyl effectively suppressed shoot growth and enhanced turf quality in RLC.

Supina bluegrass was significantly more tolerant of RLC compared to Kentucky

bluegrass although neither grass prospered at 1-2 mol PAR day⁻¹. Supina bluegrass had

greater rates of photosynthesis than Kentucky bluegrass on a turf area basis although this

was related to the higher leaf area index (LAI) of Supina bluegrass. Trinexapac-ethyl did

not affect photosynthetic rates in either species. Nitrogen rate had little effect on

photosynthesis in RLC but the high N rate did reduce LAI.

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Dedicated to my wife, Valerie Ann Stier

ACKNOWLEDGEMENTS

I would like to extend my deepest appreciation to Dr. John (Trey) N. Rogers, III, for his guidance, support, and the belief in me he has always held. I will forever consider myself the most fortunate of graduate students for all the wonderful opportunities Dr. Rogers has provided. My graduate committee also deserves special recognition for the time and efforts they have provided to me: Dr. James Flore, for the training and use of photosynthesis equipment and his lab space; Dr. Joseph Vargas, for his lab space and materials for identification of fungal pathogens as well as his insights on interacting with others; Dr. James Crum, for the special encouragement and wisdoms he shared with me. I am thankful for the help and friendship of T.J. Lawson, Richard Fogarsi, Thomas Nikolai, Mark Collins, and John C. Sorochan, as well as the myriad of student workers and golf course professionals with whom I have interacted, during the long, busy, and incredibly exciting days when we provided the world with the first indoor turfgrass athletic field at the Pontiac Silverdome for the 1993 U.S. Cup and 1994 World Cup.

TABLE OF CONTENTS

LIST OF TABLES	ix
LIST OF FIGURES	xvii
CHAPTER 1	
INTERACTION OF NITROGEN AND FLURPRIMIDOL ON KENTUCKY BLUEGRASS (<i>POA PRATENSIS</i> L.) IN REDUCED LIGHT CONDITIONS....	1
Introduction	1
Materials and Methods	2
Results and Discussion	8
Experiment I	8
Turf Quality	11
Clipping Yields	15
Surface Characteristics	20
Experiment II	25
Turf Quality	27
Clipping Yields	33
Surface Characteristics	33
Plant Density	41
Conclusions	41
CHAPTER 2	
THE EFFECTS OF TRINEXAPAC-ETHYL AND FOLIAR IRON ON SUPINA BLUEGRASS (<i>POA SUPINA</i> SCRAD.) AND KENTUCKY BLUEGRASS (<i>P. PRATENSIS</i> L.)	44
Introduction	44
Materials and Methods	46
Experimental Environment	46
Plot Construction and Maintenance	48
Data Collection	50
Results and Discussion	52
Turf Color and Quality	52
Experiment I: Turf Not Subjected to Traffic	52
Experiment II: Turf Subjected to Traffic	60
Clipping Yields	69
Experiment I: Turf Not Subjected to Traffic	69

Experiment II: Turf Subjected to Traffic	76
Turf Shear Resistance	76
Experiment I: Turf Not Subjected to Traffic	76
Experiment II: Turf Subjected to Traffic	82
Plant Density and Biomass	86
Experiment I: Turf Not Subjected to Traffic	86
Experiment II: Turf Subjected to Traffic	91
Chlorophyll Concentration	91
Experiment I: Turf Not Subjected to Traffic	91
Experiment II: Turf Subjected to Traffic	98
Conclusions	98

CHAPTER 3

PHOTOSYNTHESIS OF SUPINA BLUEGRASS (*POA SUPINA* SCHRAD.) AND KENTUCKY BLUEGRASS (*P. PRATENSIS* L.) IN REDUCED LIGHT CONDITIONS AS AFFECTED BY NITROGEN AND TRINEXAPAC-ETHYL

.....	101
Introduction	101
Materials and Methods	104
Plot Establishment and Testing	104
Experiment I: Species x PGR Study	104
Experiment II: Nitrogen x PGR Study	107
Gas Exchange Measurements	108
Leaf Area Analysis	110
Chlorophyll Analysis	110
Results	111
Experiment I: Species x PGR Study	111
Experiment II: Nitrogen x PGR Study	111
Discussion	129
Conclusion	135
APPENDIX	137
LIST OF REFERENCES	138

LIST OF TABLES

Table 1 - Photosynthetically active radiation (PAR) at the Hancock Turfgrass Research Center, East Lansing.....	9
Table 2 - Mean squares and treatment effects on the quality of Kentucky bluegrass maintained under ambient light conditions inside the Covered Stadium Simulator Facility.....	12
Table 3 - Main effects of nitrogen, flurprimidol, and traffic on the quality of Kentucky bluegrass maintained under ambient light conditions inside the Covered Stadium Simulator Facility, East Lansing, MI.....	13
Table 4 - Quality rating values for the flurprimidol-by-nitrogen and nitrogen-by-traffic interactions in Kentucky bluegrass turf maintained in ambient light conditions in the Covered Stadium Simulator Facility, East Lansing, MI.	16
Table 5 - Values for quality ratings of nitrogen-by-flurprimidol-by-traffic interaction of Kentucky bluegrass turf maintained under ambient light conditions in the Covered Stadium Simulator Facility, 22 Feb. 1994.....	16
Table 6 - Mean squares and significance of treatment effects on clipping yields of Kentucky bluegrass maintained under ambient light conditions of the Covered Stadium Simulator Facility, East Lansing, MI.	17
Table 7 - Effect of nitrogen rate, flurprimidol, and traffic on clipping yields of Kentucky bluegrass maintained under ambient light conditions of the Covered Stadium Simulator Facility (CSSF), East Lansing, MI.	18
Table 8 - Values for the significant nitrogen-by-flurprimidol interaction on clipping yields of Kentucky bluegrass maintained under ambient light conditions in the Covered Stadium Simulator Facility (CSSF), 1993-94.	21
Table 9 - Values for the significant flurprimidol-by-traffic interactions on clipping yields of Kentucky bluegrass turf maintained under ambient light conditions of the Covered Stadium Simulator Facility (CSSF)	22

Table 10 - Mean squares and significance of treatment effects on the shear resistance of Kentucky bluegrass maintained under ambient light conditions inside the Covered Stadium Simulator Facility (CSSF).....	23
Table 11 - Main effects of nitrogen, flurprimidol, and traffic on the shear resistance of Kentucky bluegrass turf maintained under ambient light conditions inside the Covered Stadium Simulator Facility (CSSF).....	24
Table 12 - Mean squares and the significance of treatment effects on the surface hardness of Kentucky bluegrass turf maintained in ambient light conditions of the Covered Stadium Simulator Facility (CSSF).....	26
Table 13 - Effects of traffic on Clegg Impact Values of Kentucky bluegrass turf maintained in reduced light conditions inside the Covered Stadium Simulator Facility (CSSF).....	26
Table 14 - Mean squares for the effects of nitrogen rate, flurprimidol, and traffic on the quality of Kentucky bluegrass maintained under supplemental light conditions inside the Covered Stadium Simulator Facility, East Lansing, MI.	28
Table 15 - Main effects of nitrogen rate and flurprimidol on the quality of Kentucky bluegrass maintained under supplemental light conditions inside the Covered Stadium Simulator Facility, East Lansing, MI.	29
Table 16 - Values for the significant interactions of nitrogen rate and flurprimidol treatment on the quality of Kentucky bluegrass maintained under supplemental light conditions inside the Covered Stadium Simulator Facility (CSSF), East Lansing, MI.	31
Table 17 - Quality ratings for the significant nitrogen rate-by-flurprimidol-by-traffic interactions on Kentucky bluegrass turf under supplemental light conditions.....	32
Table 18 - Mean squares and significance of treatment effects on clipping yields of Kentucky bluegrass maintained under supplemental light conditions of the Covered Stadium Simulator Facility, East Lansing, MI.	34
Table 19 - Effect of nitrogen rate, flurprimidol, and traffic on clipping yields of Kentucky bluegrass maintained under supplemental light conditions of the Covered Stadium Simulator Facility (CSSF), East Lansing, MI.	35
Table 20 - Clipping yields for the significant nitrogen-by-flurprimidol interactions in Kentucky bluegrass turf maintained under supplemental light conditions in the Covered Stadium Simulator Facility (CSSF).....	37

Table 21 - Clipping yields for the significant flurprimidol-by-traffic interactions in Kentucky bluegrass turf maintained under supplemental light conditions in the Covered Stadium Simulator Facility (CSSF).....	38
Table 22 - Mean squares and significance of treatment effects on the shear resistance of Kentucky bluegrass maintained under supplemental light conditions inside the Covered Stadium Simulator Facility (CSSF).....	39
Table 23 - Main effects of nitrogen, flurprimidol, and traffic on the shear resistance of Kentucky bluegrass maintained under supplemental light conditions inside the Covered Stadium Simulator Facility (CSSF).....	39
Table 24 - Mean squares and significance of treatment effects on the surface hardness of Kentucky bluegrass turf maintained under supplemental light conditions inside the Covered Stadium Simulator Facility (CSSF).....	40
Table 25 - Clegg Impact Values (g_{max}) for the flurprimidol-by-traffic interaction (3 Feb. 1993) and flurprimidol-by-nitrogen interaction (8 Apr. 1994) in Kentucky bluegrass turf maintained under supplemental light conditions inside the Covered Stadium Simulator Facility (CSSF).....	40
Table 26 - Plant density, shoot density, and verdure weight of Kentucky bluegrass maintained under supplemental light in the Covered Stadium Simulator Facility, 10 Dec. 1993 to 23 August 1994.....	42
Table 27 - Photosynthetically active radiation (PAR) at the Hancock Turfgrass Research Center, East Lansing, MI.	53
Table 28 - Mean squares and treatment effects on quality ratings of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	54
Table 29 - Mean squares and treatment effects on color ratings of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	55
Table 30 - Effect of species, trinexapac-ethyl, and iron on quality of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	56
Table 31 - Effect of species, trinexapac-ethyl, and iron on color of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	58

Table 32 - Quality rating values from selected dates for the significant species-by-trinexapac-ethyl interactions on non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	61
Table 33 - Color ratings for the significant species-by-trinexapac-ethyl interaction on non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	62
Table 34 - Mean square and treatment effects on quality of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	63
Table 35 - Mean square and treatment effects on color of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	64
Table 36 - Effect of species, trinexapac-ethyl, and iron on quality of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	65
Table 37 - Effect of species, trinexapac-ethyl, and iron on quality of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	67
Table 38 - Quality rating values for the significant species-by-trinexapac-ethyl interactions on turfgrass subjected to traffic in reduced light conditions.....	70
Table 39 - Color rating values for the significant species-by-trinexapac-ethyl interactions on turfgrass subjected to traffic in reduced light conditions.....	71
Table 40 - Mean squares and significance of treatment effects on clipping yields of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	72
Table 41 - Effects of species, trinexapac-ethyl, and iron on clipping yields of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	73
Table 42 - Values for the significant interactions of trinexapac-ethyl and species on clipping yields of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	75
Table 43 - Mean squares and significance of treatment effects on clipping yields of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	77

Table 44 - Effects of species and trinexapac-ethyl on clipping yields of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	78
Table 45 - Values from significant interactions of trinexapac-ethyl and species on clipping yields of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	80
Table 46 - Mean squares and significance of treatment effects on shear resistance of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	81
Table 47 - Effect of species and trinexapac-ethyl on shear resistance values (N•m) of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	83
Table 48 - Shear resistance values (N•m) for the significant species-by-trinexapac-ethyl interaction on non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	84
Table 49 - Mean square and significance of treatment effects on shear resistance of turfgrass subjected to traffick in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	84
Table 50 - Effect of species and trinexapac-ethyl on shear resistance values (N•m) of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	85
Table 51 - Shear resistance values (N•m) for the significant species-by-trinexapac-ethyl interactions on turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	87
Table 52 - Mean squares and treatment effects on plant density and biomass of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	88
Table 53 - Effect of species, trinexapac-ethyl, and iron on plant density and biomass of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	89
Table 54 - Plant density and biomass values for the significant species-by-trinexapac-ethyl interactions on non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	90

Table 55 - Mean squares and treatment effects on plant density and biomass of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	92
Table 56 - Effect of species, trinexapac-ethyl, and iron on plant density and biomass of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	93
Table 57 - Plant density and biomass values for the species-by-trinexapac-ethyl interactions on turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	94
Table 58 - Mean squares and treatment effects on chlorophyll of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	95
Table 59 - Effect of species, trinexapac-ethyl, and iron on chlorophyll of non-trafficked turfgrass in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	96
Table 60 - Mean squares and treatment effects on chlorophyll of turfgrass subjected to traffic in reduced light conditions, Hancock Turfgrass Research Center, East Lansing, MI.	99
Table 61 - Effect of species, trinexapac-ethyl, and iron on chlorophyll content of turfgrass subjected to traffic in reduced light conditions.....	99
Table 62 - Photosynthetically active radiation (PAR) of plots in the Covered Stadium Simulator Facility (CSSF), Hancock Turfgrass Research Center, East Lansing, MI.	106
Table 63 - Mean squares and treatment effects of species and trinexapac-ethyl on photosynthetic parameters of turfgrass maintained in reduced light conditions (approximately 5 mol PAR day ⁻¹), turf surface area basis, 23 November 1996	112
Table 64 - Photosynthetic differences between Supina bluegrass and Kentucky bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), turf surface area basis, 23 November 1996.....	113
Table 65 - Mean squares and treatment effects of species and trinexapac-ethyl on photosynthetic parameters of turfgrass maintained in reduced light conditions (approximately 5 mol PAR day ⁻¹), leaf area basis, 23 November 1996	114

Table 66 - Photosynthetic differences between Supina bluegrass and Kentucky bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), leaf area basis, 23 November 1996.....	115
Table 67 - Mean squares and significance of treatment effects on leaf area index (LAI), fresh leaf weight, and chlorophyll concentration of turfgrasses in reduced light conditions (approximately 5 mol PAR day ⁻¹), 24 Nov. 1996....	116
Table 68 - Effects of species and trinexapac-ethyl on foliage and chlorophyll of turfgrasses in reduced light conditions, approximately 5 mol PAR day ⁻¹ , 24 Nov. 1996	117
Table 69 - Mean squares and treatment effects of photosynthetic characteristics of Supina bluegrass affected by trinexapac-ethyl and nitrogen rate in reduced light conditions (approximately 5 mol PAR day ⁻¹), turf surface area basis.....	118
Table 70 - Effects of nitrogen and trinexapac-ethyl on photosynthetic parameters of Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), turf surface area basis.....	121
Table 71 - Interaction of N rate and trinexapac-ethyl on transpiration (E) and stomatal conductance (g _s) of Supina bluegrass maintained in reduced light conditions of approximately 5 mol PAR day ⁻¹	123
Table 72 - Mean squares and treatment effects of photosynthetic characteristics of Supina bluegrass affected by trinexapac-ethyl and nitrogen rate in reduced light conditions (approximately 5 mol PAR day ⁻¹), leaf area basis....	124
Table 73 - Effects of nitrogen and trinexapac-ethyl on photosynthetic parameters of Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), leaf area basis.....	126
Table 74 - Mean squares and significance of treatment effects on leaf area index (LAI), fresh leaf weight, and chlorophyll concentration of Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), 17 Nov. 1996.....	128
Table 75 - Effects of nitrogen rate and trinexapac-ethyl on leaf area index (LAI), fresh leaf weight, and chlorophyll concentration of Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), 17 Nov. 1996.....	130
Table 76 - Mean squares and treatment effects on pink snow mold (<i>Microdochium nivale</i>) effects on Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), 18 Nov. 1996.....	131

Table 77 - Effects of nitrogen rate and trinexapac-ethyl on pink snow mold (<i>Microdochium nivale</i>) damage to Supina bluegrass in reduced light conditions (approximately 5 mol PAR day ⁻¹), 18 Nov. 1996.....	131
Table 78 - Particle size analysis of sand used in sand:peat mixture (80:20).....	137
Table 79 - Particle size analysis of sand used in Experiment II: Nitrogen x PGR study (Chapter 3).....	137

LIST OF FIGURES

Figure 1 - Photosynthetic photon flux density of sunlight, ambient light inside the Covered Stadium Simulator Facility (CSSF), and supplemental light inside the CSSF supplied by 400 W high pressure sodium lamps, 1515 h, 10 Feb. 1994.....	10
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KEY TO SYMBOLS AND ABBREVIATIONS

CER, carbon exchange rate; PGR, plant growth regulator; GA, gibberellic acid; g_{max} , peak deceleration; TE, trinexapac-ethyl; PAR, photosynthetically active radiation; PPFD, photosynthetic photon flux density; L_y , langley; E, transpiration; g_s , stomatal conductance; g_m , mesophyll conductance; WUE, water use efficiency; LAI, leaf area index; N, nitrogen; P, phosphorus; K, potassium; CSSF, Covered Stadium Simulator Facility.