# CONTENTS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>i</td>
</tr>
<tr>
<td>CONTENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
<tr>
<td>ABBREVIATIONS</td>
<td>xv</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xvi</td>
</tr>
</tbody>
</table>

## CHAPTER 1

### INTRODUCTION

1.1 Importance of ornamental plants  
1.2 Plant growth and development  
1.3 Plants and their environment  
1.4 Plants-light interaction  
1.4.1 Solar-spectrum  
1.4.2 Visible light  
1.5 Discovery of photoperiodism  
1.5.1 Photoperiodic response  
1.5.2 Role of photoperiodism  
1.6 Objectives of present study

## CHAPTER 2

### REVIEW OF LITERATURE

2.1 Light integrals / Light intensity / Irradiance  
2.2 Photoperiod  
2.3 Photoperiod-sensitivity  
2.4 Plant height control

## CHAPTER 3

### MATERIALS AND METHODS

3.1 Experimental location  
3.2 Plant material and growing media  
3.3 Plant nutrition and irrigation  
3.4 Photoperiod controlled compartments  
3.5 Light measurements device  
3.6 Temperature measurements device  
3.7 Plant growth substances  
3.8 Data collection  
3.8.1 Time to flowering  
3.8.2 Plant height  
3.9 Statistical procedures applied  
3.10 Ambient environmental data  
3.10.1 Day length (hours per day)  
3.10.2 Solar radiation / photosynthetic active radiation  
3.10.3 Monthly temperature (°C)
CHAPTER 4
RESULTS AND DISCUSSION

4.1 Effects of different sowing dates (ambient day length) on time to flowering of important ornamental annuals

4.1.1 Introduction 120
4.1.2 Materials and Methods 121
4.1.3 Results 124
4.1.4 Discussion 128

4.2 Effects of different photoperiods on time to flowering of important ornamental annuals

4.2.1 Introduction 138
4.2.2 Materials and Methods 139
4.2.3 Results
   4.2.3.1 Facultative long day plants 141
   4.2.3.2 Obligate long day plants 143
   4.2.3.3 Facultative short day plants 144
4.2.4 Discussion 146

4.3 Effects of different light intensities on time to flowering of important ornamental annuals

4.3.1 Introduction 173
4.3.2 Materials and Methods 175
4.3.3 Results 176
4.3.4 Discussion 179

4.4 Effects of different shade levels (light integrals) on time to flowering of important ornamental annuals

4.4.1 Introduction 190
4.4.2 Materials and Methods 191
4.4.3 Results 193
4.4.4 Discussion 195
4.5 An appraisal of the use of reciprocal transfer experiments: Assessing the stages of photoperiod sensitivity in Pansy, Snapdragon, Petunia and Cosmos

4.5.1 Introduction
  4.5.1.1 Analytical approach presented by Ellis et al. (1992) 207
  4.5.1.2 Analytical approach presented by Adams et al. (2003) 210

4.5.2 Materials and Methods 213

4.5.3 Results
  4.5.3.1 Pansy cv. Baby Bingo (LDP) 215
  4.5.3.2 Snapdragon cv. Coronette (LDP) 215
  4.5.3.3 Petunia cv. Dreams (LDP) 216
  4.5.3.4 Cosmos cv. Sonata Pink (SDP) 216

4.5.4 Discussion 217

4.6 A comparative study on plant growth regulators and non-inductive plant environment to control plant height of important ornamental annuals

4.6.1 Introduction 223

4.6.2 Materials and Methods
  4.6.2.1 Effect of plant growth regulators on plant height 225
  4.6.2.2 Effect of non-inductive environment on plant height 226

4.6.3 Results
  4.6.3.1 Effect of plant growth regulators on plant height 227
  4.6.3.2 Effect of non-inductive environment on plant height 229

4.6.4 Discussion 231

CHAPTER 5
SUMMARY 249

CHAPTER 6
CONCLUSION 253

LITERATURE CITED 255