## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>i</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>ii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>METHODOLOGY</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>17</td>
</tr>
<tr>
<td>Preparation of solutions</td>
<td>17</td>
</tr>
<tr>
<td>Placing the seeds for germination</td>
<td>18</td>
</tr>
<tr>
<td>Standard germination test</td>
<td>19</td>
</tr>
<tr>
<td>Treatments</td>
<td>19</td>
</tr>
<tr>
<td>Details of different operations</td>
<td>20</td>
</tr>
<tr>
<td>Spraying of experimental solutions</td>
<td>21</td>
</tr>
<tr>
<td>Recording of observations</td>
<td>21</td>
</tr>
<tr>
<td>Details of observations recorded</td>
<td>22</td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td></td>
</tr>
<tr>
<td>SEEDLING GERMINATION AND GROWTH</td>
<td>32</td>
</tr>
<tr>
<td>MORPHO-PHENOLOGICAL CHARACTERISTICS</td>
<td></td>
</tr>
<tr>
<td>(A) VEGETATIVE MORPHOLOGY AND GROWTH PARAMETERS</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>36</td>
</tr>
<tr>
<td>Diameter of shoot base</td>
<td>39</td>
</tr>
<tr>
<td>Leaf size</td>
<td>42</td>
</tr>
<tr>
<td>No. of leaves/plant</td>
<td>47</td>
</tr>
<tr>
<td>Leaf area/plant</td>
<td>51</td>
</tr>
<tr>
<td>Leaf area Index</td>
<td>52</td>
</tr>
<tr>
<td>Leaf angle</td>
<td>56</td>
</tr>
<tr>
<td>Leaf Area Duration</td>
<td>59</td>
</tr>
<tr>
<td>Relative Leaf Growth Rate</td>
<td>59</td>
</tr>
<tr>
<td>Stomatal Index</td>
<td>62</td>
</tr>
<tr>
<td>Absolute Growth Rate</td>
<td>63</td>
</tr>
<tr>
<td>Biomass Duration</td>
<td>67</td>
</tr>
<tr>
<td>Relative Water Content</td>
<td>70</td>
</tr>
<tr>
<td>Canopy Temperature Depression</td>
<td>70</td>
</tr>
<tr>
<td>Chlorophyll content</td>
<td>73</td>
</tr>
<tr>
<td>Chlorophyll intensity</td>
<td>75</td>
</tr>
<tr>
<td>(B) YIELD AND YIELD PARAMETERS</td>
<td></td>
</tr>
<tr>
<td>Time taken for booting</td>
<td>78</td>
</tr>
<tr>
<td>Parameter</td>
<td>Page</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Time taken for anthesis</td>
<td>79</td>
</tr>
<tr>
<td>Flower morphology</td>
<td>79</td>
</tr>
<tr>
<td>Flag leaf</td>
<td>82</td>
</tr>
<tr>
<td>Flag leaf area</td>
<td>83</td>
</tr>
<tr>
<td>Tiller number / plant</td>
<td>86</td>
</tr>
<tr>
<td>Number of spikes / plant</td>
<td>89</td>
</tr>
<tr>
<td>Spikelet number</td>
<td>89</td>
</tr>
<tr>
<td>Spikelet number / plant</td>
<td>90</td>
</tr>
<tr>
<td>Peduncle length</td>
<td>93</td>
</tr>
<tr>
<td>Awn length</td>
<td>94</td>
</tr>
<tr>
<td>Spike length</td>
<td>94</td>
</tr>
<tr>
<td>Days for maturity of grain</td>
<td>95</td>
</tr>
<tr>
<td>Grain number on main spike</td>
<td>95</td>
</tr>
<tr>
<td>Grain number / plant</td>
<td>98</td>
</tr>
<tr>
<td>Dry grain weight of 100 seeds</td>
<td>102</td>
</tr>
<tr>
<td>Grain weight / plant</td>
<td>102</td>
</tr>
<tr>
<td>Straw weight / plant</td>
<td>103</td>
</tr>
<tr>
<td>Harvest Index</td>
<td>106</td>
</tr>
<tr>
<td><strong>(C) BIOCHEMICAL PARAMETERS</strong></td>
<td></td>
</tr>
<tr>
<td>Micronutrient in grains</td>
<td>109</td>
</tr>
<tr>
<td>Protein content in grains</td>
<td>109</td>
</tr>
<tr>
<td><strong>ANATOMICAL STUDY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>CORRELATIVE STUDIED</strong></td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**                                115

**CONCLUSION**                                  139

**PLATES**                                      150

**REFERENCES**                                  174

**APPENDIX**                                     174

**LIST OF PUBLICATIONS**