<table>
<thead>
<tr>
<th>Name</th>
<th>Hari Singh Meena</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll No.</td>
<td>8794</td>
</tr>
<tr>
<td>Discipline</td>
<td>Genetics</td>
</tr>
<tr>
<td>Degree for which thesis submitted</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Date of joining the P.G. School</td>
<td>18th August, 2001</td>
</tr>
<tr>
<td>Date of thesis Seminar</td>
<td>15th September, 2005</td>
</tr>
<tr>
<td>Date of submission of Thesis</td>
<td></td>
</tr>
<tr>
<td>Major Subject</td>
<td>Genetics</td>
</tr>
<tr>
<td>Minor field</td>
<td>Plant Physiology</td>
</tr>
<tr>
<td></td>
<td>Agriculture Statistics</td>
</tr>
<tr>
<td>Name of the Chairman</td>
<td>Dr. J. Kumar</td>
</tr>
<tr>
<td>Advisory Committee Members</td>
<td></td>
</tr>
<tr>
<td>Co-chairman</td>
<td>Dr. S.S. Singh</td>
</tr>
<tr>
<td>Members</td>
<td>Dr. S.S. Yadav</td>
</tr>
<tr>
<td></td>
<td>Dr. P.S. Deshmukh</td>
</tr>
<tr>
<td></td>
<td>Dr. U.C. Sud</td>
</tr>
<tr>
<td>Title of Thesis</td>
<td>“Genetic studies of traits related to drought tolerance in chickpea (Cicer arietinum L.)”</td>
</tr>
</tbody>
</table>

**ABSTRACT**

The investigation was undertaken to study the effect of moisture stress on various traits, estimating extent of genetic variability for drought tolerance, identifying traits most relevant to moisture stress tolerance and to find out the gene action and combining ability of traits related to drought tolerance. Field and laboratory screening were carried out to screen 30 chickpea genotypes for drought tolerance. These genotypes were evaluated for 16 characters including yield, yield components and some morpho-physiological and seedling traits under irrigated and rainfed conditions. Moisture-stress caused significant reduction in overall mean performances for all the characters. The percent reduction due to moisture-stress was higher for susceptible
genotypes as compared to tolerant genotypes. Genotypes viz. ICCV 10, ICC 4958, Pusa 362 and Pusa 256 were found most tolerant and Pant G114 and H 208 were most susceptible according to study on mean performances and estimates of drought susceptibility indices. Biological yield, number of branches per plant, plant height, 100-seed weight, number of pods per plant, harvest index, RWC and MII under field conditions and root length, shoot length and germination percentages under PEG were found to be related to moisture-stress tolerance. Variation among the genotypes was higher under rainfed condition. Biological yield, harvest index, plant height, 100-seed weight, number of pods per plant, number of branches per plant and RWC had highly significant positive correlation with seed yield. Six parents (4 tolerant and 2 susceptible) were crossed in a diallel mating design to produce 15 F_1's. The F_1's and parents were evaluated for 12 characters that were most relevant to moisture-stress tolerance. Genetic studies based on combining ability analysis were carried out following Griffing's Method II and Model I. Though both the additive and non-additive components were significant for all the traits in both the environments, the non-additive components were relatively more important in all the cases. The number of crosses showing heterosis over better parent and mid-parent were higher under irrigated than rainfed condition for most of the traits and the manifestation of heterosis was mainly due to high sca effects. Parents viz. ICC 4958, Pusa 256, ICCV 10 and Pusa 362 maintained overall high gca status. The crosses viz., Pusa 256 x H 208, Pant G114 x Pusa 256 and Pant G114 x H 209 showed heterosis due to strength of high sca status.