

## CONCLUSIONS

Following are the major conclusions drawn from the experimental results during the current study for my thesis:

1. Using miRNA microarray approach, we have identified 58 differently expressed miRNAs in *Arabidopsis thaliana* seeds under different germination conditions, like imbibition at room temperature or cold stratification.
2. Based on statistical significance and annotation, we have selected 15 differentially expressed miRNAs and validated their expression using stem loop qRT-PCR.
3. During the process of seed germination, a number of miRNAs, such as miR165/166, miR156, miR172, miR390 etc. were differentially regulated in different applied germination conditions. We observed that most of the miRNAs were highly upregulated during 24h of imbibition, irrespective of stratification condition.
4. Using psRNATarget tool, we found more than one targets for each miRNA and annotated them from putative function. A total of 27 different targets of 15 selected miRNAs were identified and validated through qRT-PCR.
5. In majority of the cases, we observed a strong correlation between the expression pattern of miRNAs and their targets (showing opposite expression pattern), which suggests the role of miRNA mediated post-transcriptional gene regulation in seed germination.
6. Interestingly, the expression of miR390, which regulate the production of tasiR-*ARF* from *TAS3* transcripts, correlated with that of tasiR-*ARF* targets *ARF2/3/4*. Mutation in tasiRNA biogenesis component *SGS3* showed altered seed viability and germination, specifically under heat, dehydration and ABA related stress conditions. Thus, our results also suggest the role of miRNA- ta-siRNA crosstalk in the dynamic process of seed germination under normal and stressed conditions.
7. Seeds of transgenic target mimic line of miR165/166 (*eTM-miR165/166*), which over expressed target *HD-ZIP III*, showed altered germination rate under different abiotic stress conditions. This result provides experimental evidences for the role of miR165/166 and target *HD-ZIP III*s module in seed germination under normal and stressed conditions.