 **Dr. bhupendra chaudhary**

Head of Department

School of Biotechnology, GBU

***Eligible to supervise****Masters and PhD students – email on* [*bhupendra@gbu.ac.in*](mailto:bhupendra@gbu.ac.in) *to*

*discuss the availability*

----------------------------------------------------------------------------------------------------------------------------------------

My research investigates the genomics, and genetic engineering of crop plants for improved field traits and resistance to stress conditions. I am specifically interested in the development of genomic resources responsible for cotton fiber development and their impact on the future crop improvement strategies. Current work also explores the paracrine and long-distance hormonal activities of cytokinin in root-to-shoot communication that will be utilized in the development of transgenic mustard with enlarged root system exhibiting increased drought tolerance without having negative side effects in the aerial organs. I am most concerned with identifying novel genes and their functional aspects and engaging them in a sustainable and rewarding application in the field that improves the agricultural outcomes for the society.

I welcome inquiries from Masters and PhD candidates interested in: Plant Functional Genomics, Genetic Engineering and Biotechnology of Crop Plants, *In vitro* Regeneration of Crop Plants, Gene Expression Dynamics, especially during cellular development and elongation.

***My current projects include:***

* ***Comparative Functional Genomics of Cotton Fiber Development***

We had generated genomic resources and identified candidate genes important to fiber development and evolved under domestication, using a microarray platform that interrogates 42,429 unigenes. Interestingly, prolonged fiber growth in the domesticated cotton was associated with enhanced hormone signalling genes, delayed stress-responsive gene expression and modulation of cell-wall structural genes, such as profilin gene family. Currently, our research group is mainly focussing on- *(1)* *spatio*-temporal expression characterization of cotton profilins (*GhPRF*s) in fiber-cell metabolism by generating RNAi-transgenics and over-expressed profilin in fibers; and *(2)* target-mimicry based silencing of *miR167*gene family for up-regulation of Auxin Response Factors (hormone-signalling) in cotton fibers. These objectives are certainly enhancing our basic knowledge of candidate genes considered to be important for cotton fiber elongation. Also, assigning functions to such genes, and analysis/processing of diverse genomic/geneic information are generating novel insights into genetic architecture of the key biological processes at system and function level.

* **Enhanced Drought Tolerance in Indian Oilseed Mustard**

This project focuses on the genetic transformation of Indian mustard *Brassica juncea* with the inhibition of cytokinin, a regulator of root growth in a root-specific manner that may contribute to improve drought tolerance by the formation of a larger root system; as well as increased nutrient efficiency of transgenic mustard plants. This establishes an approach for modulating root system architecture that will be useful for generating crop plants optimized to grow in difficult agricultural environments. This also increases our understanding of the paracrine and long-distance hormonal activities of cytokinin in root-to-shoot communication.

* **Genetics of *in vitro* Regeneration in Cotton**

A prerequisite to the development of genetic transformation in any crop is the availability of a regeneration system. In cotton, *in vitro* regeneration from hypocotyl and cotyledonary explants has been reported to follow somatic embryogenesis pathway, and is highly genotype dependent. And, there are strong basis for a genetic control of regeneration through embryogenesis in cotton. Inheritance of *in vitro* regeneration traits is being followed by crossing of fully-regenerating (FR) and non-regenerating (NR) near-isogenic lines (NILs) in hybrid and segregating populations. This project also has implications for the development of pure lines of regeneration trait into elite Indian cotton cultivars. These fully-regenerating lines will be highly beneficial for gene stacking by introducing more economically important genes directly to Indian varieties, without failure.