Deciphering the Genomic Terrain Unveils 14 Chemosensory Proteins in the Whitefly *Bemisia tabaci* Asia II-1

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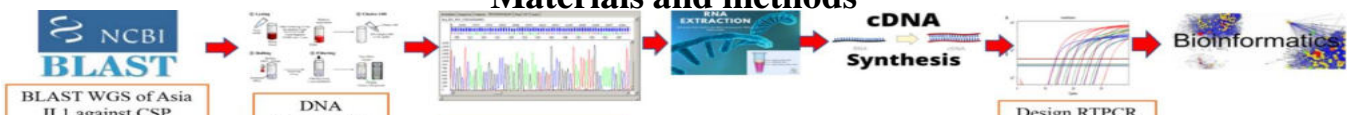
Introduction

Arthropods use chemosensory proteins (CSPs) to detect odors, aiding in finding food, mates, and avoiding threats.There is no information regarding these proteins in AsiaII1 cryptic species, which are predominant in the Indian subcontinent; as a result, this study was conducted.

Materials and methods



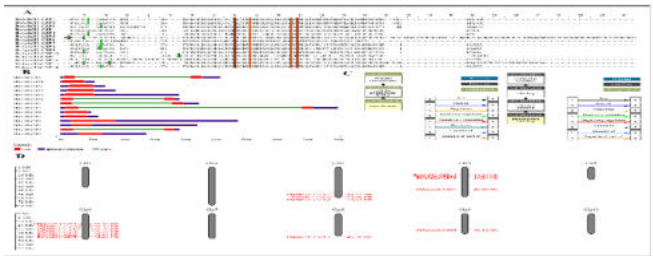
BLAST WGS of Asia II 1 against CSP sequences of other genetic group of *Bemisia tabaci* and retrive closet match of CSP genes, and design primer for these.

DNA extraction by Chelex method

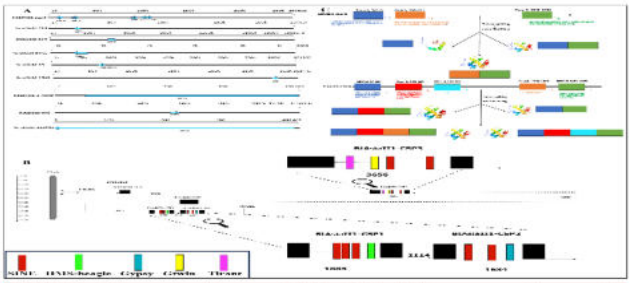
PCR amplification of candidate CSP genes followed by sanger sequencing

Design RTPCR specific primers for CSP genes and study gene expression

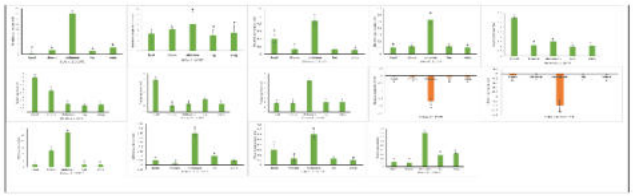
Result and discussion



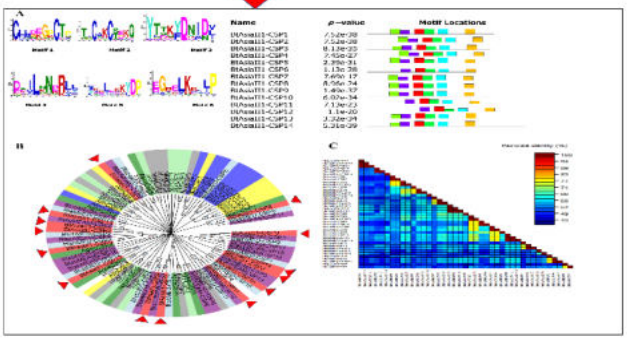
Clustal X-aligned BtAsiaII1 CSPs with conserved/non-conserved cysteines, gene structures, and functional profile (OS-D superfamily and PhBP domain) mapped on *B. tabaci* chromosomes (Bioproject ID: PRJEB47898).



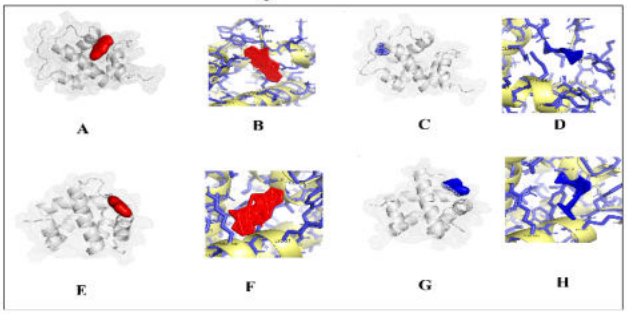
BtAsiaII1 CSP gene locations on *B. tabaci* Asia II-1 genome, with genomic organization on chromosome 6, retrotransposon insertions, and proposed splicing mechanisms for CSP 8 and 14.



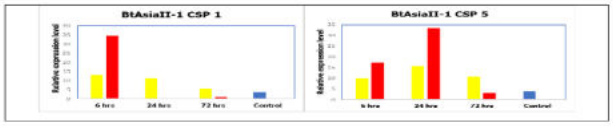
BtAsiaII1 CSPs expression across tissues assessed by RT-qPCR (2-ΔΔCt method)



A. Motif patterns, CDS length, and sequence conservation in *B. tabaci* Asia II-1 CSPs, B. Phylogenetic tree of BtAsiaII1 CSPs among hemipterans, and C. Color-coded pair-wise identity matrix showing CSP similarity in *B. tabaci* genetic groups.



Binding and internal contact visualization: CSP1 with fipronil (A, B), CSP1 with imidacloprid (C, D), CSP5 with fipronil (E, F), CSP5 with imidacloprid (G, H).



BtAsiaII1 CSP1 and 5 transcript levels in different time intervals after exposure to insecticides as measured by RT-qPCR.

- For the first time, 14 CSPs (Chemosensory Proteins) have been identified and characterized in *B. tabaci* Asia II-1 through computational analysis and structure predictions, marking a novel discovery in science
- CSPs were found to cluster on specific chromosomes, suggesting potential co-regulation.
- Spatial expression analysis indicated tissue-specific roles for CSPs in chemosensory processes.
- This research has the potential to significantly influence the manipulation of whitefly behavior and the development of innovative control strategies.