Transformation and expression studies of Chitinase-II gene in *Zea mays* inbred lines

Presenting author: Qurban Ali

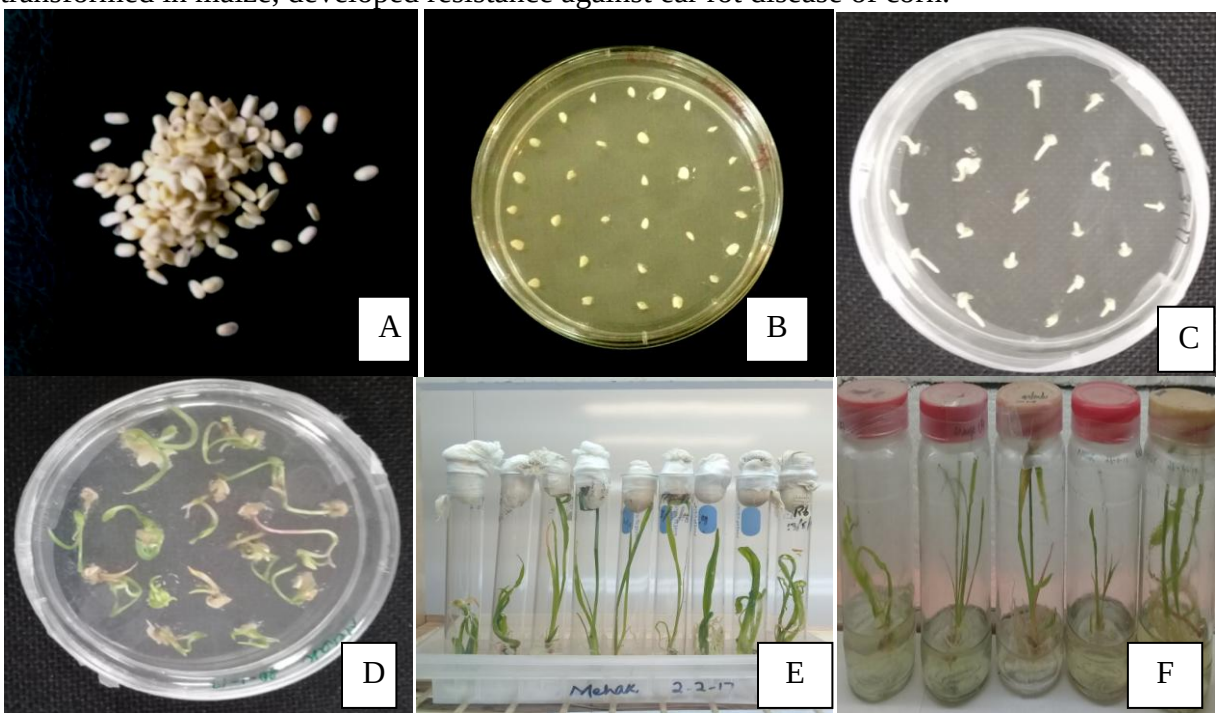
Corresponding Email address: saim1692@gmail.com

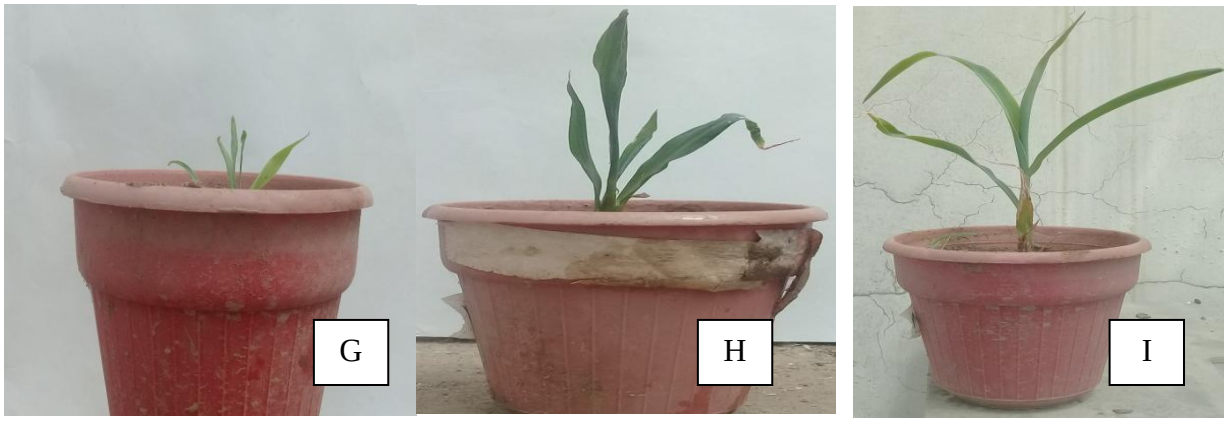
Co-authors:

Mehak Shakir, Abdul Munim Farooq, Idrees Ahmad Nasir and Muhammad Nadeem Hafeez

Abstract

Agrobacterium mediated transformation was performed to introduce fungal resistant gene into the immature embryos of corn. For transformation, barley chitinase II gene of 690bp was transformed into the plant by using the pCAMBIA 1301 vector under control of ubiquitin promoter. Embryos were grown over the induction and then regeneration media. Presence of gene was confirmed in the regenerated transgenic maize plants through PCR by amplification. A sharp band of 690bp was observed in maize transgenic plants. Further, for the confirmation of stable gene integration in positive transgenic plants Dot blot analysis was performed, which showed the presence of band on the membrane. Maize line CEMB-44 showed transformation efficiency up to 1.7%. Histochemical GUS assay and fungal inhibition assay were also carried out. Transgenic crude protein extracted from CEMB-44 transgenic plants showed 49% of fungal inhibition percentage. Transgenic maize plant was selected for the evaluation of whole plant resistance to *Fusarium verticilliodes* along with non-transgenic plant, through in-vitro anti-fungal bioassay. After 2 weeks, control plant turned brown and dried but CEMB-44 transgenic plant remains green. From the results, it was concluded that barley chitinase II gene when transformed in maize, developed resistance against ear rot disease of corn.





(A) Embryos collected from the maize kernel (B) Embryos are grown over the growth induction media (C-D) Shows growth of embryos on plates containing MS media Growth of transformed maize plants in (E) Test-tubes, (F) Jars and (G-I) Pots

Publications

1. Iqbal MS, Jabbar B, Sharif MN, **Qurban Ali**, Husnain T, and Nasir IA (2017) *In silico* MCMV Silencing Concludes Potential Host-Derived miRNAs in Maize. *Front. Plant Sci.* 8:372. doi: 10.3389/fpls.2017.00372. (**IF = 4.495**).
2. Fawad Ali, Muhammad Ahsan, **Qurban Ali*** and Naila Kanwal. 2017. Multivariate analysis of *Zea mays* yield traits against drought stress. *Front. Plant Sci.* 8:1379. doi: 10.3389/fpls.2017.01379. (**IF = 4.495**).
3. Ibrahim Bala Salisu, Ahmad Ali Shahid, Amina Yaqoob, **Qurban Ali***, Kamran Shehzad Bajwa, Abdul Qayyum Rao and Tayyab Husnain. Molecular approaches for high throughput detection and quantification of genetically modified crops: A review. *Front. Plant Sci.* 8:1670. doi: 10.3389/fpls.2017.01670. (**IF = 4.495**).
4. Muhammad Umair MAJID, Mudassar Fareed AWAN, Kanza FATIMA, Muhammad Sufyan TAHIR, **Qurban ALI*,** Bushra RASHID, Abdul Qayyum RAO, Idrees Ahmad NASIR, Tayyab HUSNAIN. Genetic resources of chilli pepper (*Capsicum annuum* L.) against *Phytophthora capsici* and their induction through various biotic and abiotic factors: a review. Cytology and Genetics, 51(4): 296-304. (**IF = 0.324**).
5. Zahida Qamar, Idrees Ahmad Nasir, Saman Riaz, **Qurban Ali*** and Tayyab Husnain. 2017. Molecular cloning, transformation and evaluation of different transgenic sugarcane lines for GTGene and Cry1Ac gene. 51(5): 401-412. **(IF = 0.324**).
6. Muhammad Umair MAJID, Mudassar Fareed AWAN, Kanza FATIMA, Muhammad Sufyan TAHIR, **Qurban Ali*,** Bushra RASHID, Abdul Qayyum RAO, Idrees Ahmad NASIR, Tayyab HUSNAIN. Phytophathora capsici on chilli pepper (Capsicum annuum L.) and its management through genetic and bio-control: a review. Zemdirbyste-Agriculture, 103(4): 419-430. (**IF = 0.644**).
7. Khadija Aaliya, Zahida Qamar, Idrees Ahmad Nasir, ***Qurban Ali**, Abdul Munim Farooq and Tayyab Husnain. 2016. Transformation, evaluation of GTGene and multivariate genetic analysis for morpho-physiological and yield attributing traits in *Zea mays*. Genetika. 48(1):423-433. (**IF = 0.351**).
8. Saif-ul-Malook, **Qurban Ali**, Muhammad Ahsan, Muhammad Khalid Shabaz, Muhammad Waseem, and Amar Mumtaz 2016. Combining ability analysis for evaluation

of Maize Hybrids under drought stress. Journal of National Science Foundation Sri Lanka, 44(2): 123-130. (**IF = 0.42**).

9. Abbas H. G., A. Mahmood and ***Qurban Ali** (2016): *Zero tillage: a potential technology to improve cotton yield.* GENETIKA, 48(2): 761-776. (**IF = 0.351**).
10. Agung Nugroho Puspito, Abdul Qayyum Rao, Muhammad Nadeem Hafeez, Muhammad Shahzad Iqbal, Kamran Shehzad Bajwa**, Qurban Ali***, Bushra Rashid, Muhammad Adil Abbas, Ayesha Latif, Ahmad Ali Shahid, Idrees Ahmad Nasir, and Tayyab Husnain. Transformation and evaluation of Cry1Ac+Cry2A and *GTGene* in *Gossypium hirsutum* L. Frontiers in Plant Sciences *6:943. doi: 10.3389/fpls.2015.00943*. **(IF = 4.495**).
11. Fawad Ali, Naila Kanwal, Muhammmad Ahsan, **Qurban Ali**, Irshad Bibi, and Nabeel Khan Niazi, "Multivariate Analysis of Grain Yield and Its Attributing Traits in Different Maize Hybrids Grown under Heat and Drought Stress," Scientifica, vol. 2015, Article ID 563869, 6 pages, 2015. doi:10.1155/2015/563869.

Biography:

I am Dr. Qurban Ali from Lahore, Pakistan. Currently, I am working as Assistant Professor at Institute of Molecular Biology and Biotechnology (IMBB), University of Lahore, Lahore, Pakistan. I have expertise in gene editing, cloning and plant transformation; I have developed a first triple gene genetically engineered maize hybrid of Pakistan, which confers significant resistance against biotic and abiotic stresses. I have utilized E. coli and yeast expression models to screen mutated genes before transformation in plants. I am currently doing a research project in abiotic tolerance of cotton and maize to learn more about reverse genetics. In this project we are using CRISPR cas9 genome editing to study genes associated with abiotic stress tolerance.

Email: saim1692@gmail.com Ph# +923219621929