

Introgression of Bacterial Blight Resistance Genes (*Xa21*, *xa13* and *xa5*) into CB 174 R, an Elite Restorer Line in Rice

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Abstract: Bacterial blight caused by *Xanthomonas oryzae* pv. *oryzae* (Xoo) is one of the major disease caused severe yield reduction in the rice growing regions. One dominant (*Xa21*) and two recessive genes (*xa13* and *xa5*) were introgressed into CB 174 R through marker assisted breeding. The present study found three (*Xa21+xa13+xa5*) and two (*Xa21+xa13* or *Xa21+xa5* or *xa5+xa13*) genes introgressed combinations in the early segregated materials through foreground selection. The identified homozygous/heterozygous individuals forwarded to next cycles of breeding to fix homozygous conditions for all three genes with an improved agronomic performance background, and thus could be used as a donor source for future rice breeding programme.

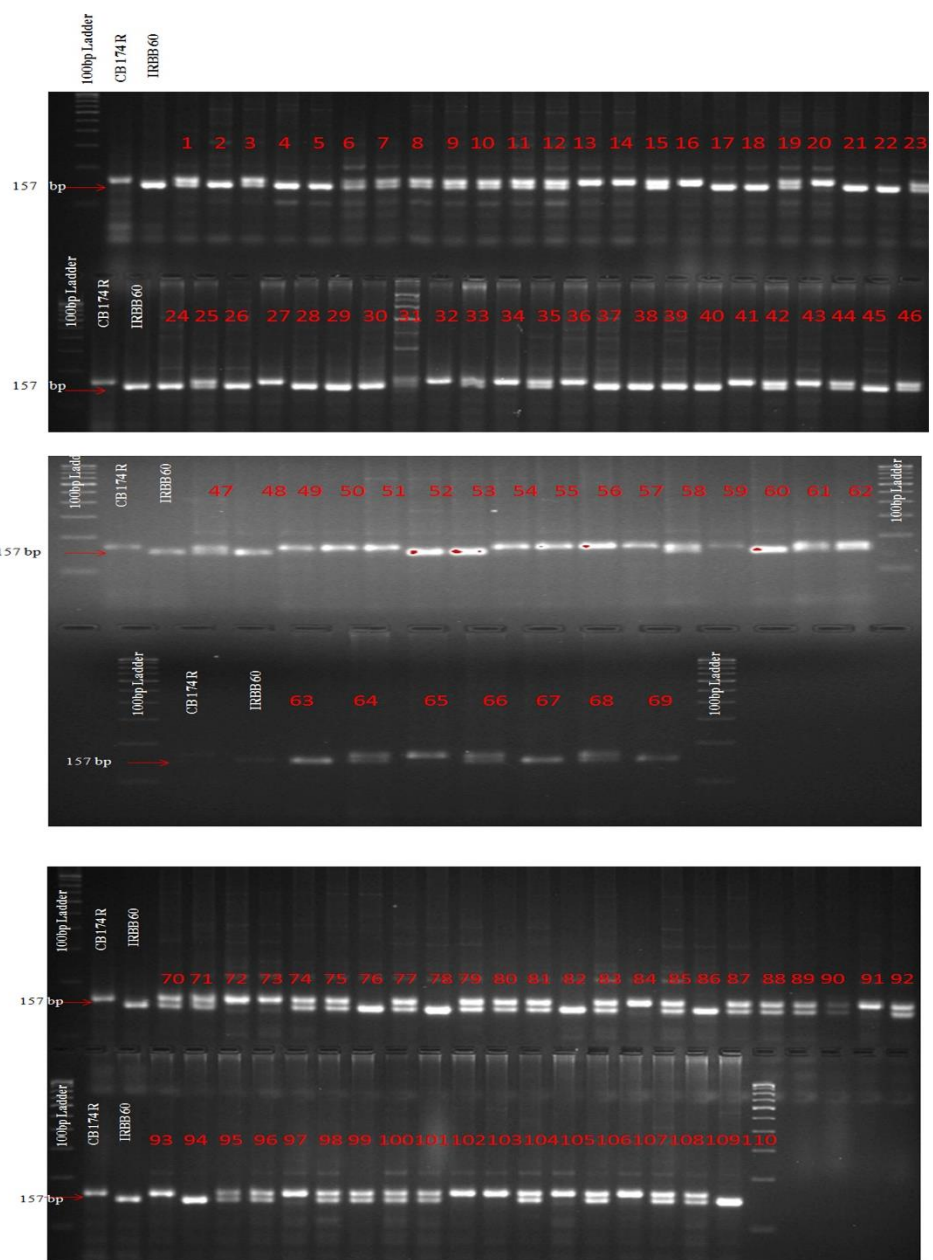
Keywords: marker assisted selection; gene specific marker; gene pyramiding

Results and Discussion

- Fifty-four (42 having *Rf4*) out of 110 F₂ individuals identified as having three/two genes combination in this study.
- Five F₂ individuals were in heterozygous state for all three genes (*Xa5xa5*, *Xa13xa13* and *Xa21Xa21*), and also two individuals had heterozygous resistance for two loci (*Xa5xa5* and *Xa13xa13*) and homozygous for one locus (*Xa21Xa21*), along with fertility genes which were characterized earlier.
- Presence of *Xa21* in homozygote or heterozygote state in combinations with other genes found to have higher level of resistance.
- Also, two recessive genes shown higher level of resistance when they were in homozygote (*xa5xa5* and *xa13xa13*) than heterozygote (*Xa5xa5* and *Xa13xa13*) condition.
- The identified different combinations of homozygous/heterozygous resistance plants F₂ with fertility restoration genes, and the subsequent F_{2:3} families showed an improved agronomic performance would be used as a donor parent for future rice breeding programme.

Conclusions

BB resistance genes identified in heterozygous and/ or homozygous with superior agronomic performances of the studied breeding materials led to use as a donor parent in the BB resistance genes introgression breeding.



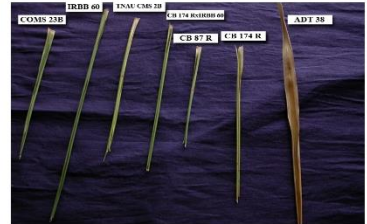
Identification of *Xa21* gene in rice



Bacterial inoculum



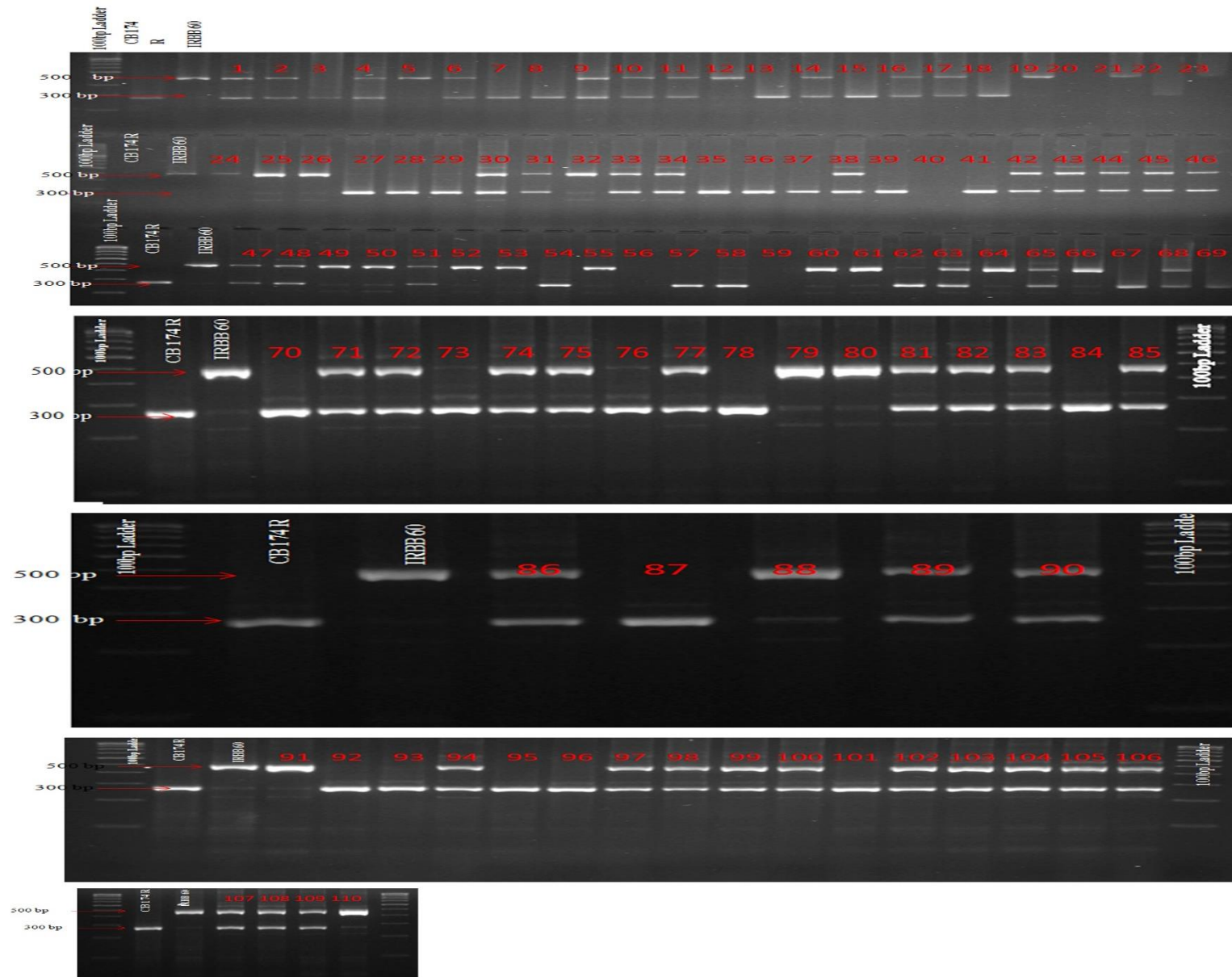
Inoculation with Spores by Leaf clipping method



Reaction of Parental lines against BB

Phenotype screening for BB in parents and F₁





Identification of *xa13* gene in rice

Acknowledgments

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