

# RXam-1 : a Xa21 cassava homologue associated to bacterial blight resistance in cassava



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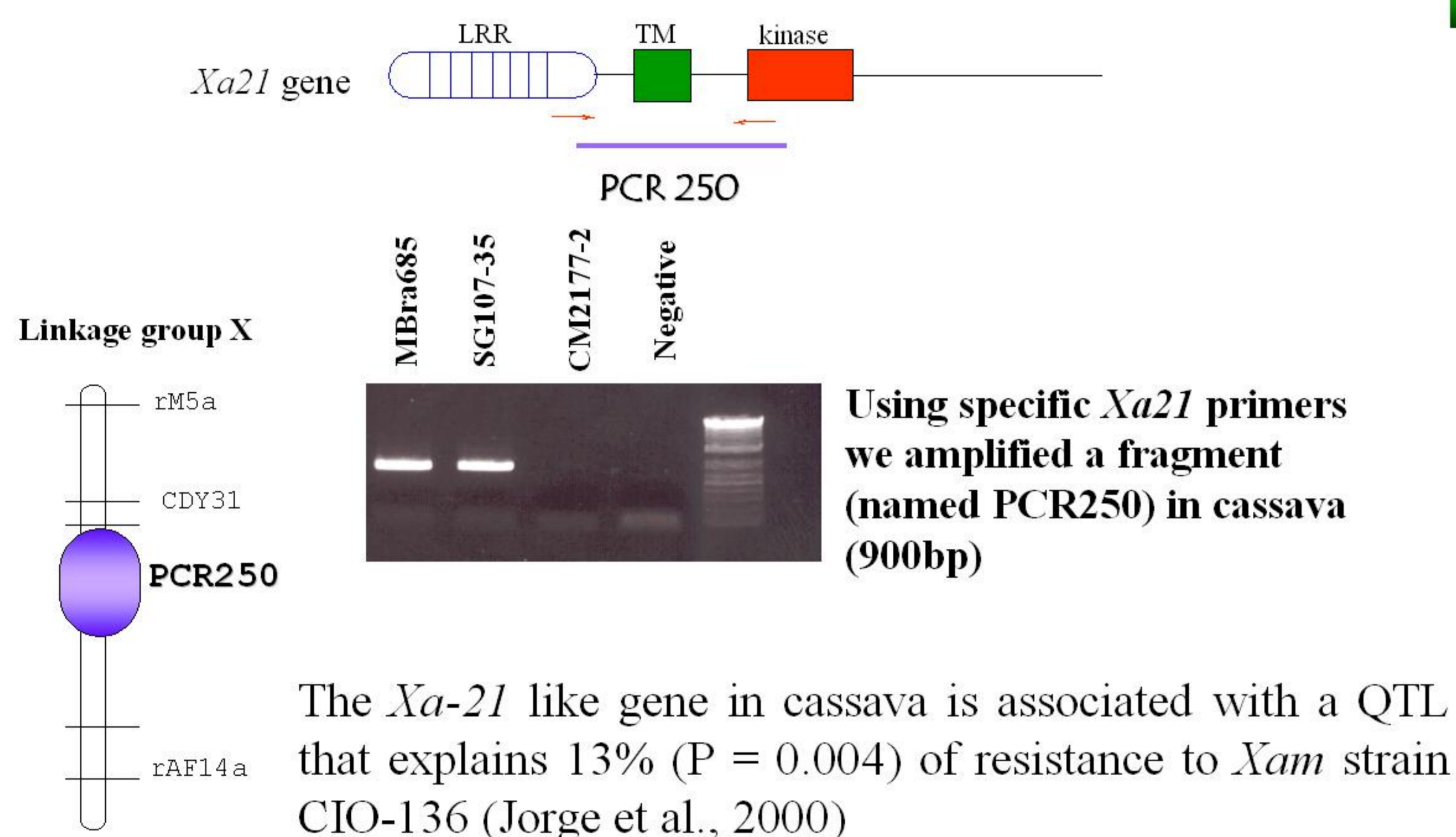
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The rice gene *Xa21* represents a class of resistance genes (R-gene) conferring resistance to *Xanthomonas oryzae* pv *oryzae*. *Xa21* encodes a receptor like-kinase consisting of LRRs in the putative extracellular domain.

Cassava is a major tropical food crop providing food and income for about 600 million people in the world. Cassava Bacterial Blight (CBB), caused by *Xanthomonas axonopodis* pv. *manihotis* (*Xam*), is a major disease for the crop and is endemic in Africa and Latin America. The use of varietal resistance is the most realistic way to control the disease. We have identified and characterized an homologue of *Xa21* (*RXam-1*) in cassava. *RXam-1* is associated to one QTL that confers resistance to *Xam* strain CIO-136.

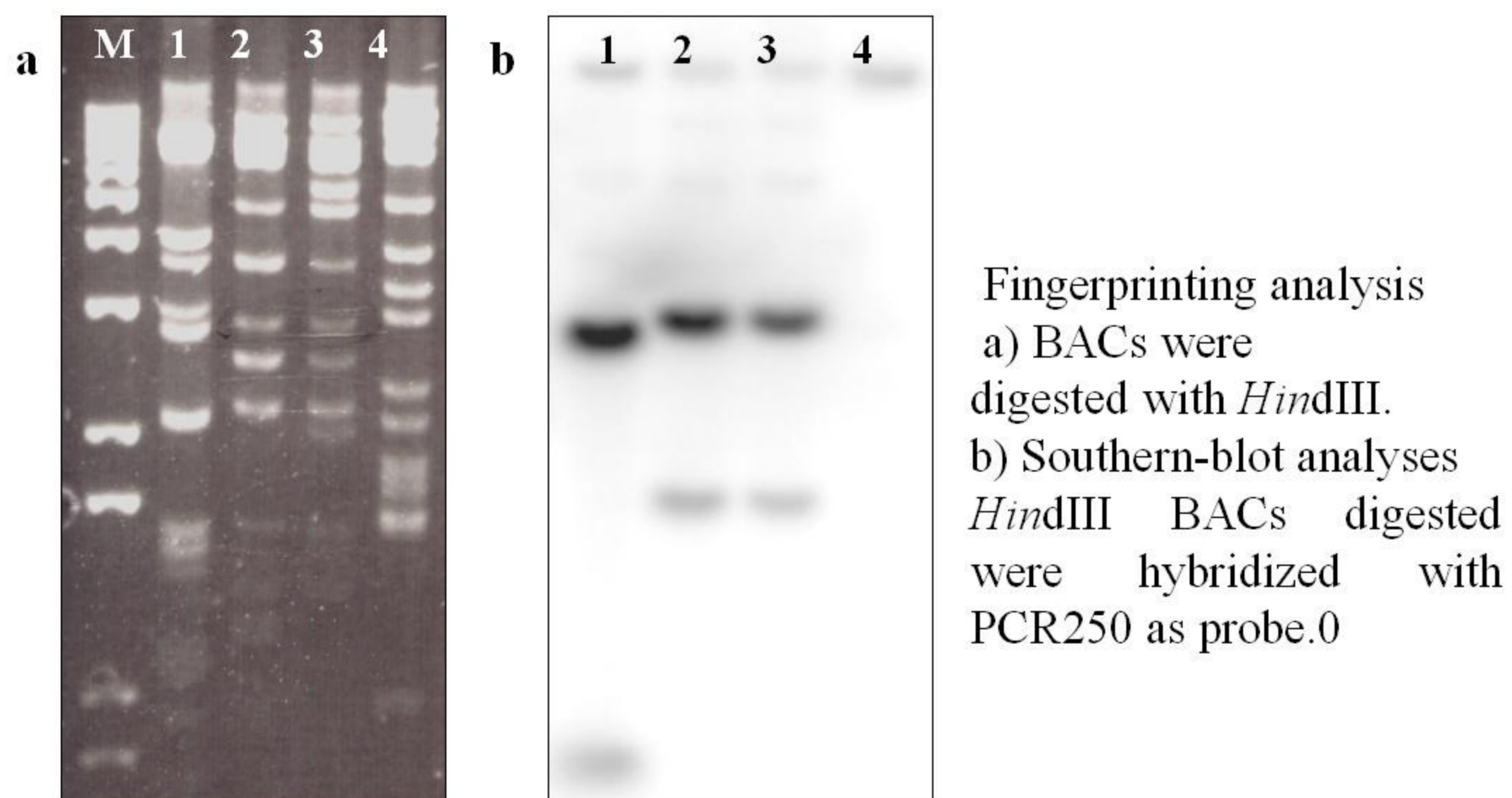
## Amplification of a Xa21-like gene in cassava



## Screening a cassava BAC library

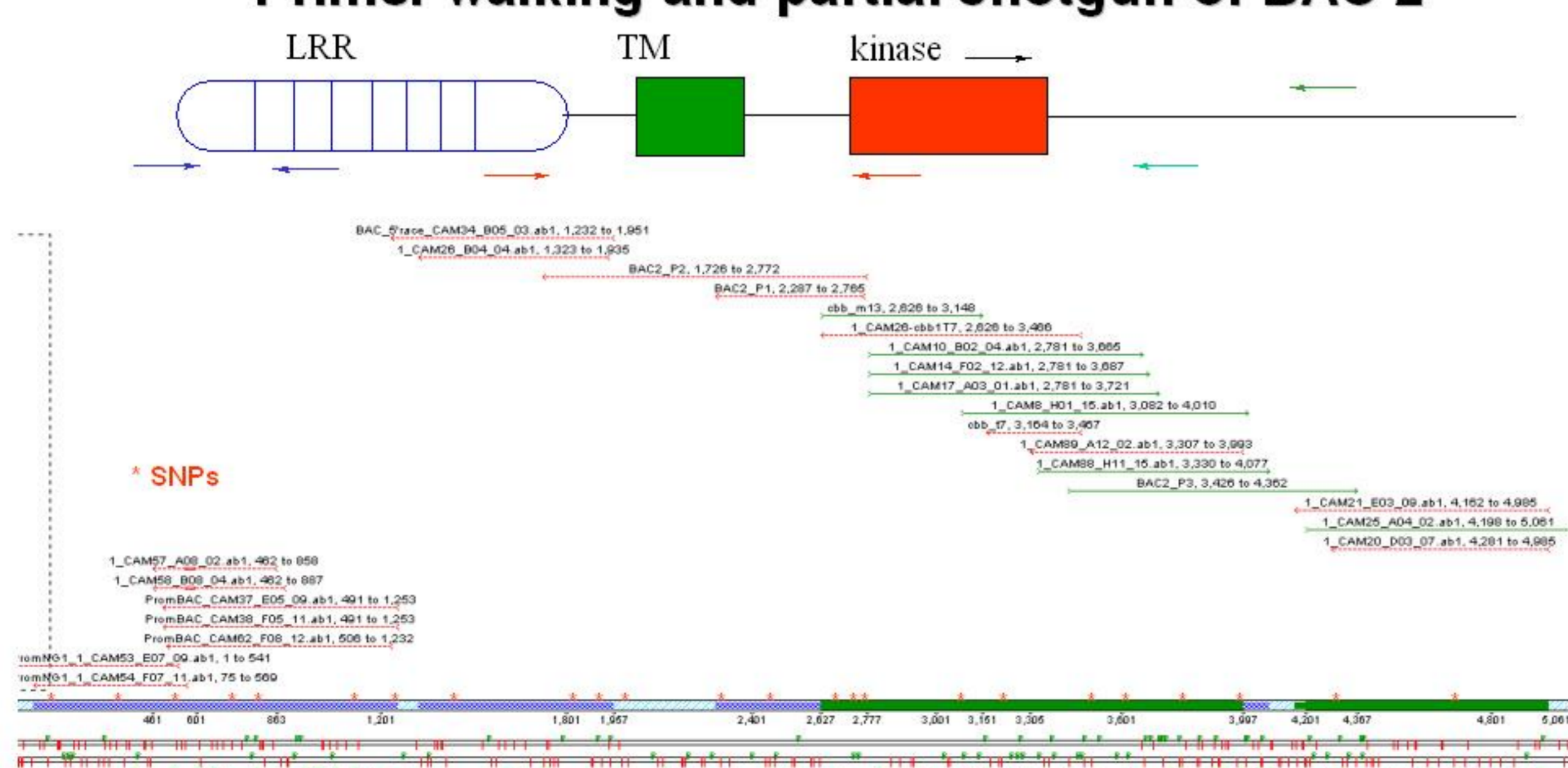
Four BAC clones (1 to 4) were detected in the cassava BAC library (var. TMS3001 susceptible to *Xam* CIO-136 strain)

Fingerprinting analysis showed that one of them may represent a false positive. Two of them (BAC 1 and 2) form a contig containing 2 copies of PCR250



## Partial BAC sequence

### Primer walking and partial shotgun of BAC 2



Schema of assembled contig from BAC2

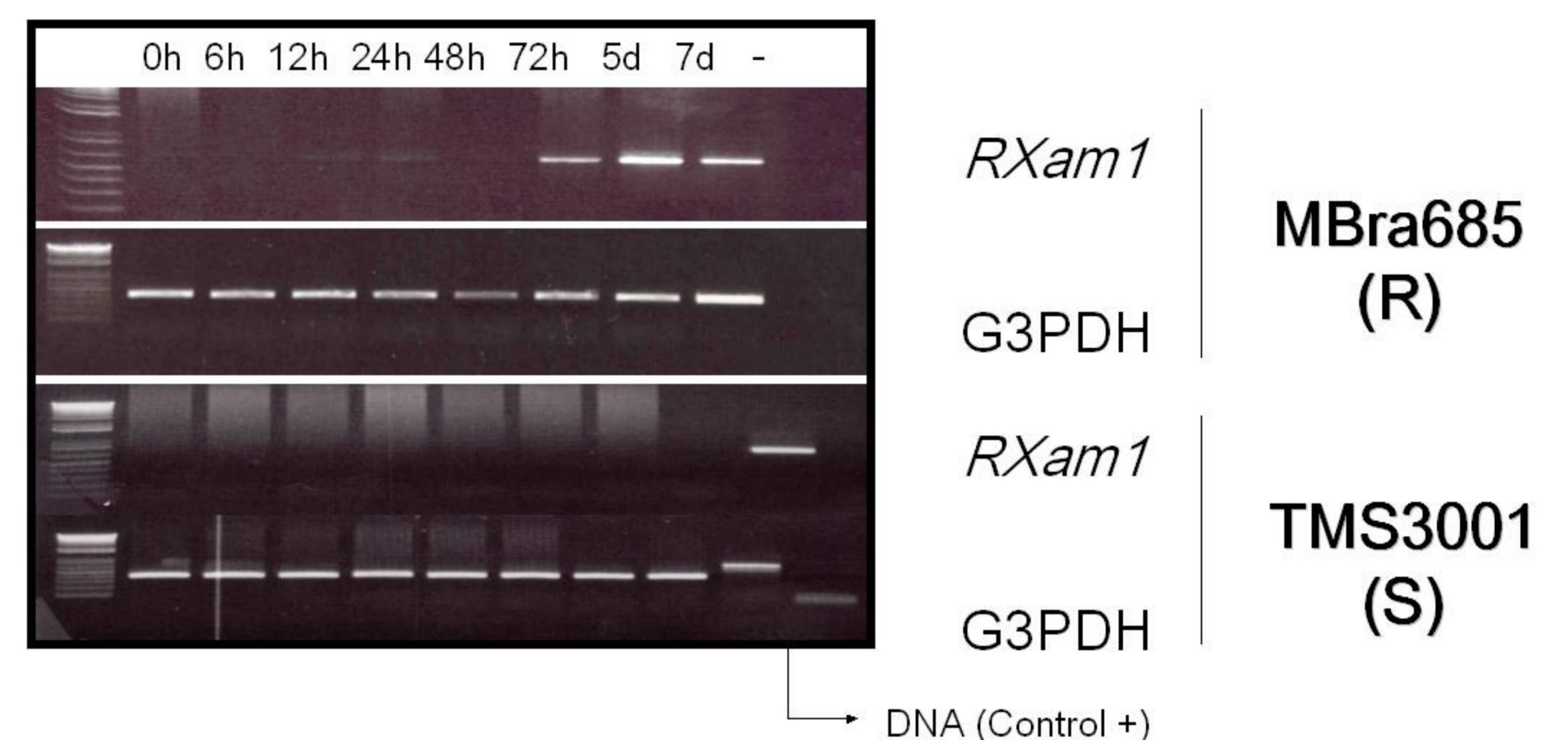
## Sequence analysis of RXam-1

Comparative analysis of *RXam-1* sequences obtained from TMS3001 (S) and MBRA685 (R)

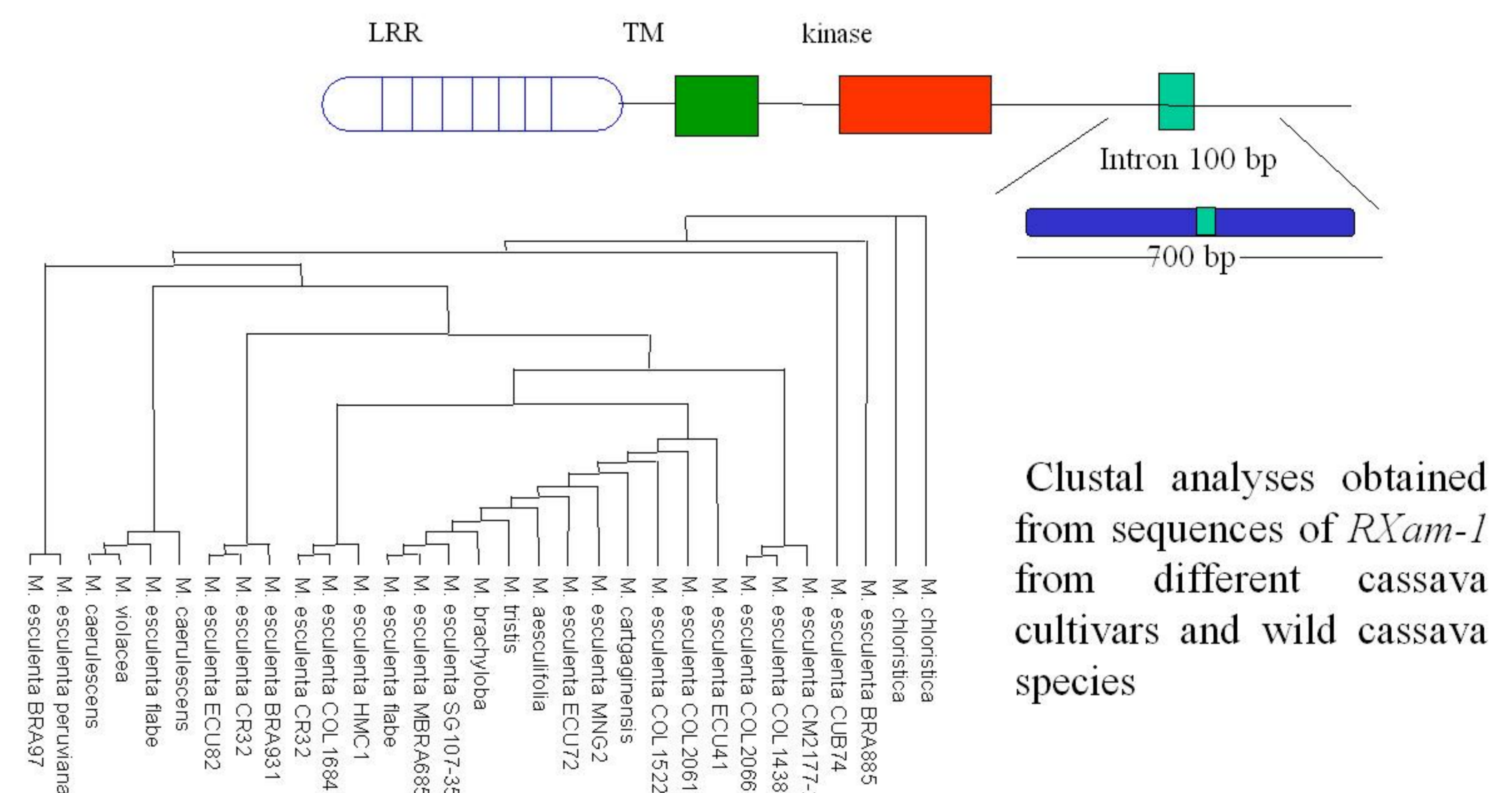
	Sequenced region	Complete ORF	Identity to <i>Xa21</i>	LRR domain	Ser/thr kinase domain
TMS3001 (BAC2)	4.6 kb	-	34%	Yes	Yes
MBRA685	3.5 kb	Yes	35%	Yes	Yes

## Expression and phylogeny analysis

■ Expression of *RXam-1* is induced after infection by *Xam* CIO-136 in the resistant cultivar but not in the susceptible one



■ Phylogeny analysis of *RXam1*



High similarity among different cassava cultivars and wild species

Highlight the importance of *RXam-1* gene function

## Perspectives

- To isolate and characterize the *RXam-1* promoter for further plant genetic transformation with *RXam1*
- Functional analysis of *RXam1* using a cassava transformation system and/or silencing (VIGS)
- Correlate the sequence polymorphism observed with resistance level of different cassava cultivars to *Xam* CIO136