

( )

*Macrophomina phaseolina*

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ISSR

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- (Sanei *et al.*, 2005) (Mirabolfathi, 1991)  
(Aghajani & (Afshari Azad, 2008) *Macrophomina phaseolina* (Tassi) Goid.  
Safaie, 2008) (Pearson *et al.*,  
(1986)  
(Dhingra & Sinclair, 1973)  
*M. phaseolina*  
(2006) Crous *et al.* .  
*M. phaseolina*  
(Botryosphaeriaceae)  
(Dhingra & Sinclair, 1973)  
(*formae*  
*speciales*)  
(Su *et al.*, 2001)  
*M. phaseolina*  
(Suriachandraselvan &  
(1995) Mihail & Taylor .Seetharaman, 2000)  
(Manici *et al.*, 1995; (Abawi & Pastor-  
(Corrales, 1990)  
Mayek-Perez *et al.*, 2001; Mihail & Taylor, 1995;  
Miklas *et al.*, 1998; Su *et al.*, 2001)  
(Mayek-Perez *et al.*, 2001; Mihail (Almeida *et al.*, 2003)  
& Taylor, 1995)  
ITS *M. phaseolina*  
*M. phaseolina*  
(Babu (Wrather *et al.*, 2001)  
Mayek-Perez *et al.* .*et al.*, 2007)  
(2001)  
Su *et al.* . (Gafarian, 2000)  
(2001)  
(Raeyat (Hamdollahzadeh, 1991)  
(Golzar, 1989) Panah, 2002)

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(Müller-Starck *et al.*, 1992)

(Zietkiewicz *et al.*, 1994)

(2005a) Jana *et al.*

*M. phaseolina*

(Aghakhani & Dubey, 2009; Almeida *et al.*, 2007; Aghakhani & Dubey, 2009; Almeida *et al.*, 2003; Su *et al.*, 2001) 2007; Aghakhani & Dubey, 2009; Almeida *et al.*, 2003; Almeida *et al.*, 2008; Das *et al.*, 2006; Jalali *et al.*, 2009a; Jana *et al.*, 2003; Meena *et al.*, 2006; Omar *et al.*, 2007; Pecina-Quintero *et al.*, 2001; Rajkumar & Kuruvinashetti, 2007; Su *et al.*, (Brooker *et al.*, 2001; Zade *et al.*, 2009) *et al.*, 2008; Mayek-Perez *et al.*, 2001; Pecina-Quintero *et al.*, 2001; Reyes-Franco *et al.*, 2006; Saleh *et al.*, 2009; Vandemark *et al.*, 2000) - (Jana *et al.*, 2005b) (Purkayastha *et al.*, 2008) (Jana *et al.*, 2005a; Purkayastha *et al.*, 2008) (2009a) Jalali *et al.*

ISSR

(Jalali *et al.*, 2009a)

(Jalali *et al.*, 2009b)

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سالها

- 
1. Restriction Fragment Length Polymorphism
  2. Random Amplified Polymorphic DNA
  3. Amplified Fragment Length Polymorphism
  4. Universal Rice Primer- PCR
  5. Repetitive Sequence-Based PCR
  6. Inter Simple Sequence Repeats
  7. Simple Sequence Repeats=SSRs
  8. Microsatellites

)  
) ( °C  
(Potato Dextrose Broth) ( °C  
/ °C  
(2005) Safaie *et al.*  
)  
(  
( )

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1. Potato Dextrose Agar

*Macrophomina phaseolina*

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*M. phaseolina*

( )  
 °C  
 °C  
 Eppgradient (Thermal cycler)  
 /  
 /  
 (1x) TBE  
 X  
 /  
 (Cluster Analysis)  
 (UPGMA)  
 NTSYS-PC  
 ( , )  
 )  
 ( ) ( )  
 ( )  
 ( ) ( )  
 ( )  
 ( )  
 ( ) ( )

(PCR Master Mix)  
 (10x) /  
 /  
 dNTPs / MgCl<sub>2</sub>  
 / dNTPs /  
 Taq  
 :  
 MpKFI (5'-CCGCCAGAGGACTATCAAAC-3')  
 MpKRI (5'-CGTCCGA AGCGAG GTGTA TT -3')

(2007) Babu *et al.*

°C  
 °C  
 °C  
 °C  
 Eppgradient

*Sclerotinia sclerotium*  
*Cytospora schusleri* *Trichoderma harzianum*

TBE %

**ISSR**

(PCR Master Mix)  
 /  
 / MgCl<sub>2</sub> /  
 / dNTPs /  
 / dNTPs  
 Taq

1. Unweighted Pair Group Method With Arithmetic Average
2. Jaccard's Coefficient

(2005a) Jana *et al.*

°C

°C

*M. phaseolina* ( ) ( )

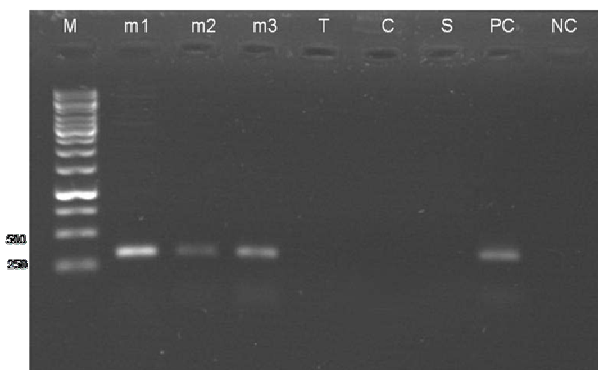
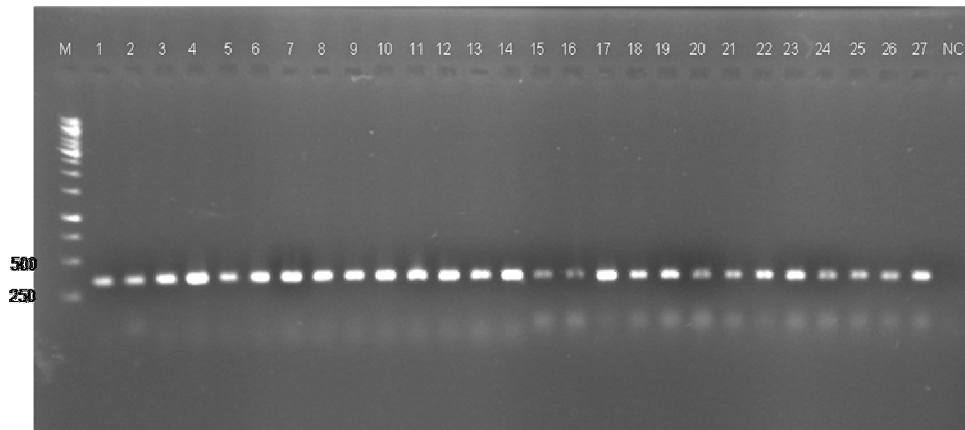
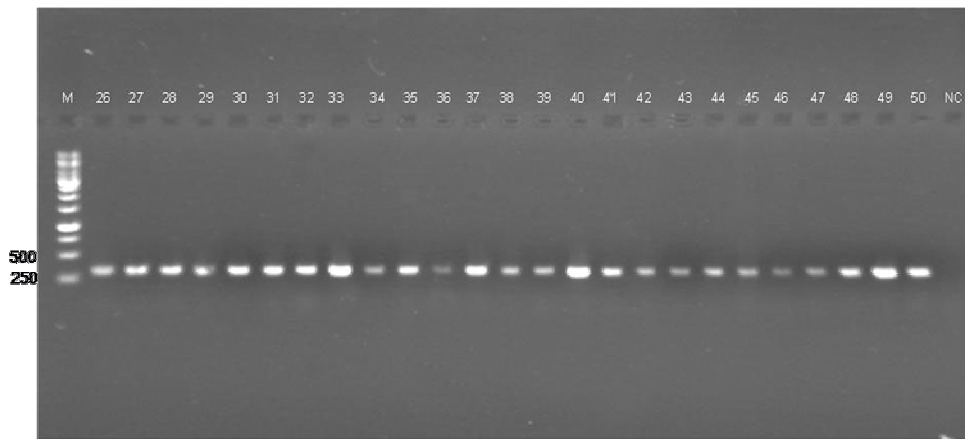
( ) ( )

MpKRI MpKFI ( ) ( )

) ( )

*M. phaseolina* (

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*Macrophomina phaseolina*

: (MpKFI/MpKRI)

: *M. phaseolina*

(m3 m2 m1)

T=Trichoderma

S= Sclerotinia

C=Cytospora schusleri harzianum

) :PC . sclerotiorum

.1Kb

:M

:NC (

Jana <i>et al.</i> , 2005	48	5'-ACTG ACTG ACTG ACTG-3'	ISSR2
Jana <i>et al.</i> , 2005	50	5'-GACAC GACAC GACAC GACAC-3'	ISSR5
Jana <i>et al.</i> , 2005	52	5'-CACCACCACCACCAC-3'	ISSR10
Islam <i>et al.</i> , 2003	57	5'-GTCGTCGTCGTCGTCGTCGTC-3	PcMs
Vasserur <i>et al.</i> , 2005	47	5'-CCACCACCACCACCA-3'	ISSR09
Stepansky <i>et al.</i> , 1999	47	5'-ATGATGATGATGATGATG-3'	P4
Stepansky <i>et al.</i> , 1999	48	5'-ACACACACACACACACYC-3'	P5
Stepansky <i>et al.</i> , 1999	48	5'-GAGAGAGAGAGAGAGAYG-3'	P6
Arbaoui <i>et al.</i> , 2008	48	5'-GACAGACAGACAGACATT-3	LB-B

**ISSR**

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P4 ISSR09 PcMs ISSR10 ISSR5

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°C °C

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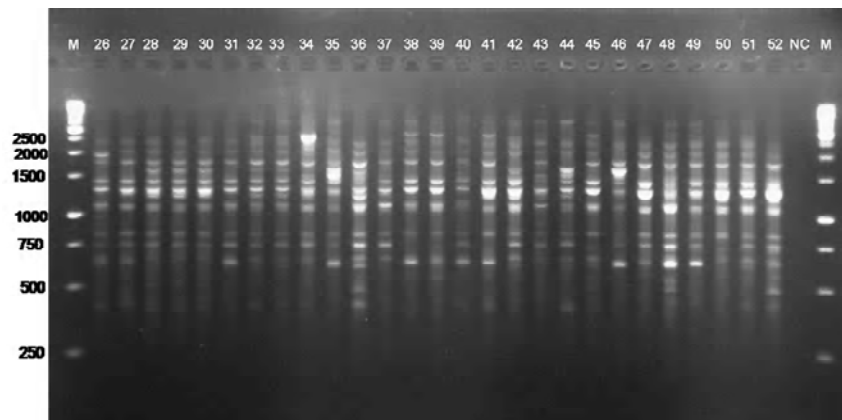
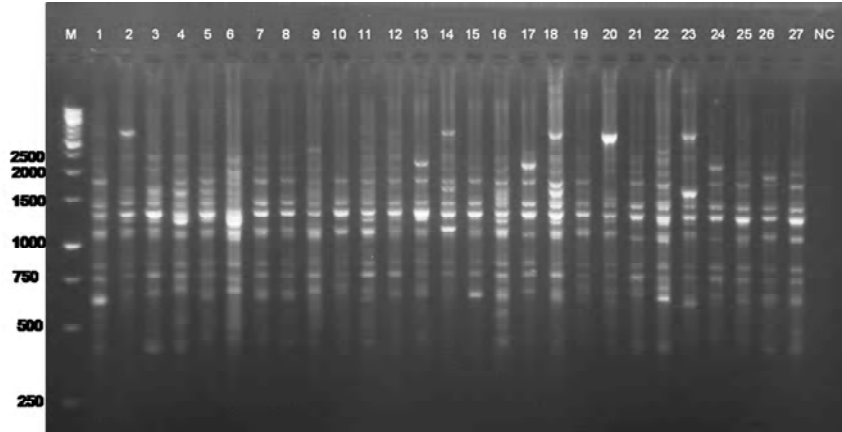
ISSR5 ISSR2

( ) ISSR5 ISSR2

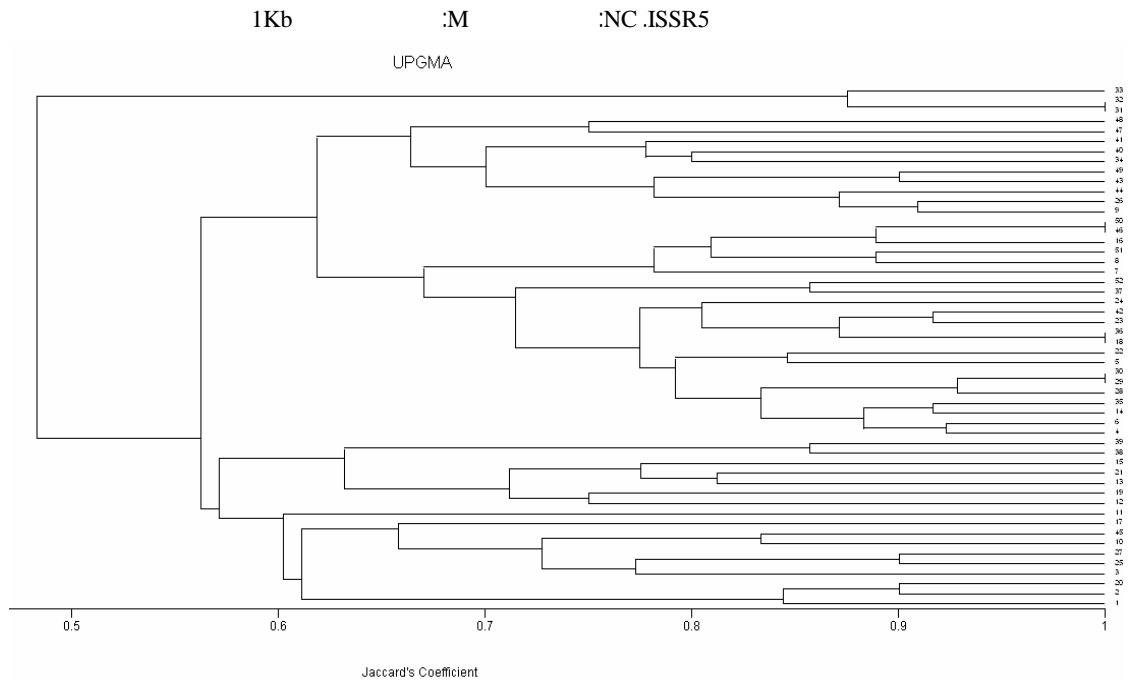
P4 ISSR09 PcMs ISSR10

) ( ) P4 ISSR09

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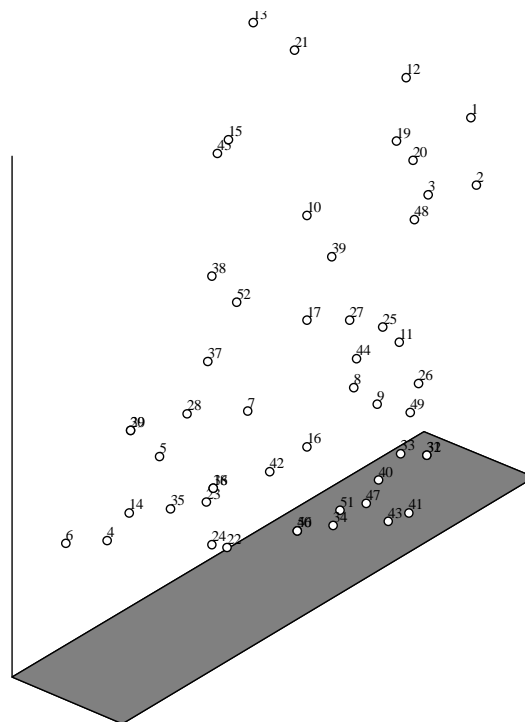


*Macrophomina phaseolina*



UPGMA

*Macrophomina phaseolina*



UPGMA

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(1973) & Sinclair

(2007) Babu *et al.*

MpKRI MpKFI

ITS

*M. phaseolina*

*M. phaseolina*

*M. phaseolina*

*M. phaseolina*

(Jana *et al.*, 2005a)

P4 ISSR09 PcMs ISSR10 ISSR5 ISSR

Dhingra

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)  
(2005a) Jana *et al.*  
(2001) Su *et al.*  
Su *et al.*  
(2001)  
*M. phaseolina*  
(2003) Jana *et al.* ( )  
OPA-13  
*M. phaseolina* ( )  
(Purkayastha *et al.*, 2006)  
Purkayastha *et al.*  
(2008)  
(2005b) Jana *et al.*  
*M. phaseolina*  
(2009a, b) Jalali *et al.*  
)

(Carlile, 1986)

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1. Para Sexual Recombination

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