

()

*

(// : // :)

()

x

x

%

IPC1 Sc 76
EV4 SIP4) AMMI4

(AMGE4
Sc 76

(Kang & Gorman, 1989)

)

(

()

(Bidinger et al., 1996)

(Evans et al., 2002; Lin et

(Khodabandeh, 1995)

(1951) Sprague & Federer al., 1986)

×

(Farzad, 1997)

×

FAO

(Khodabandeh, 1995)

×

(Crossa, 1990)

(Fehr &

Hadley, 1980)

(G×E)

%

(G×E)

(%)

(%)

(Fatahi et al., 2003)

(FAO)

:

G×E

/

/

()

GEI ()

%

(Crossa et al., 1991)

(1990) Gauch

(×)

(1983) Clements et al. (1981) Byth

" " " "

" " ()

...

:

(Zij) ×

.(Marcelo Soriano Viana & Cruz, 2002)

PCA

:

(AMMI)

N

×

$$Y_{ger} = \mu + \sum_{n=1}^N \sigma_n \zeta_{gn} \eta_{en} + \theta_{ge} + \varepsilon_{ger}$$

.(Bidinger et al., 1996)

θ_{ge}

μ

ε_{ger}

()

δ_n :

n

(Hayward et al.,

×

ζ_{gn}

(λ^{05})

n

.1993)

n

η_{en}

n

.(Kang, 2002)

E

.(Cossa et al., 1991)

G×E

(MET)

(1984) Kempton .

×

(F.A)

.(Tai, 1979)

(1988, 1990) Gauch & Zobel

(P.A)

×

FANOVA

×

1. Ordination
2. Hierarchical Methods
3. Full Model
4. Reduced Model
5. Multi-Environmental Trials
6. Factor Analysis
7. Pattern Analysis

(Crossa et al., 1990; Kearsay & Pooni, 1996;
(1990) Gauch & Zobel .Kempton, 1984)

G×E

.(Willers et al., 1995)

×

F

/ %

F

F

(FGH₂)

.(Baker, 2002)

)

(1990) Gauch

(

(2000) Burak & Broccoli

()

.(Crossa et al., 1990)

()

()

(Kearsay & Pooni,

.1996)

()

(2000) Torrecillas & Bertoia

IPC

P2 P1

()

IPC

(ECT)

IPC

... :
 % / (PCA)
 ×
 (/ × / ×) ECT

%

N

IPCA

PCA

G+E-2n-1

IPCA

$$Y_{ijk} = \mu + g_i + e_j + \sum_{n=1}^N \delta_n \zeta_{in} \eta_{jn} + \theta_{ij} + \varepsilon_{ijk}$$

j i Yijk
 e_j g_i μ k
 n δ_n
 N
 (I.P.C.)
 ζ_{in} (N ≤ min(g-1), (e-1))
 (IPC) n i
 n j η_{jn}
 θ_{ij} (IPC)
 ε_{ijk} ()

SIPC

(Gauch, 1988)

AMGE EV

(Sneller et al., 1997)

$$SIPC = \sum_{n=1}^N |\lambda_n^{0.5} \zeta_n|$$

$$EV = \frac{\sum_{n=1}^N \zeta_{in}^2}{N}$$

$$AMGE = \sum_{n=1}^N \sum_{j=1}^M \lambda_n \zeta_{in} \eta_{jn}$$

...

:

()

F			
/	/	۷۷	
/ **	/	۱۱	
/ **	/		
/ **	/		×
**	/		IPCA 1
/ **	/		IPCA 2
/ **	/		IPCA 3
/ **	/		IPCA 4
/ n.s.	/		

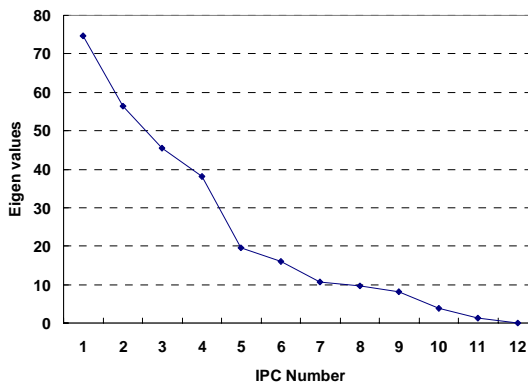
:** n.s.

F			
n.s.	/		
/ n.s.	/		
/ **	/		×
/	/		
/ **	/		
/ **	/		
/ **	/		×
/ n.s.	/		×
/ n.s.	/		×
/ **	/		×
-	/		
-	/		

α = % : ** n.s.

(α = %)

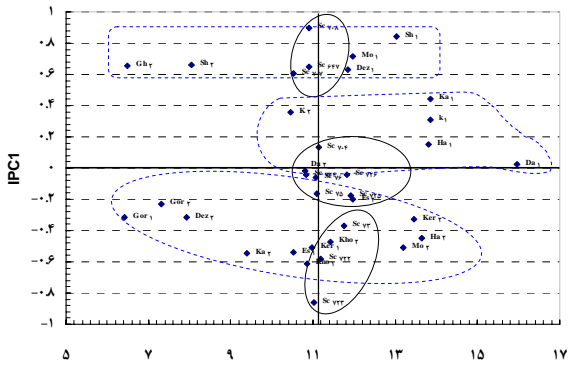
SC 725	/	a
SC 726	/	a
SC 73	/	a
SC 722	/	b
SC 704	/	b
SC 75	/	b
SC 76	/	b
SC 723	/	b
SC 708	/	b
SC 647	/	bc
SC 724	/	bc
SC 707	/	c



()

×

1. Scree graph



()

() IPC1

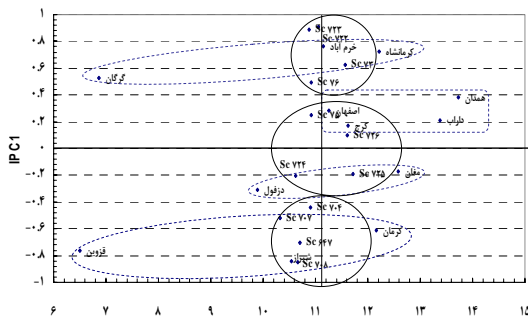
×

IPC1

IPC1

IPC

IPC1



()

×

IPC1

()

F

SIPC4

AMGE4 EV4 SIPC4

$$\frac{1}{\lambda^4} \gamma_{ik}$$

()

EV4

()

AMGE4

AMMI4

	SIPC ₄	EV ₄	AMGE4
SC 708	/	/	/
SC 76	/	/	/
SC 75	/	/	/
SC 73	/	/	/
SC 707	/	/	/
SC 722	/	/	/
SC 723	/	/	/
SC724	/	/	/
SC 725	/	/	/
SC 726	/	/	/
SC 647	/	/	/
SC 704	/	/	/

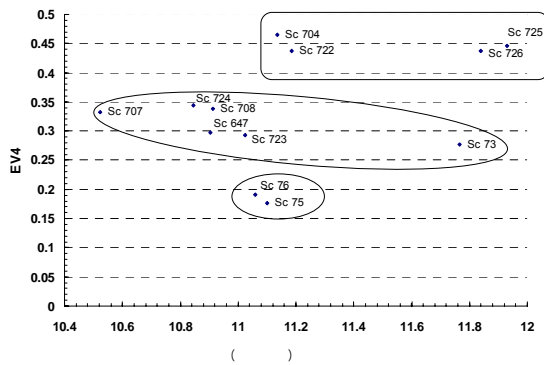
AMMI4

EV4 SIPC₄ AMGE4

SIPC4

SC76 SC75

×



شکل ۵- نمودار دو بعدی حاصل از مقادیر میانگین عملکرد دانه و EV4 ژنوتیپها. خطوط پیوسته گروه‌بندی‌های حاصل از تجزیه خوشه‌ای ژنوتیپها را بر مبنای مقادیر EV4 نشان می‌دهند.

(1977) Chapman et al.

(1997) Chapman et al.

(2003) Shah Mohammadi

(1997) Chapman et al.

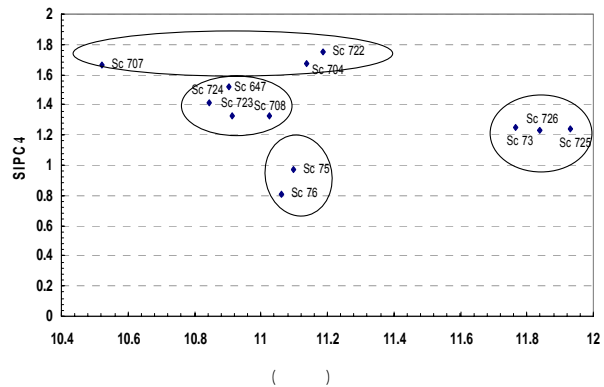
(1997) Chapman et al.

SC722
SIPC4

SIPC4
SC707 SC704

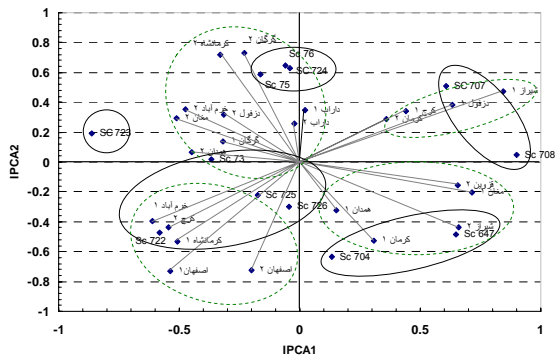
()

EV4
SC75 SC76
EV4
EV4
EV4
SIPC4
SC76 SC75
()
SIPC4 EV4



SIPC4

SIPC4

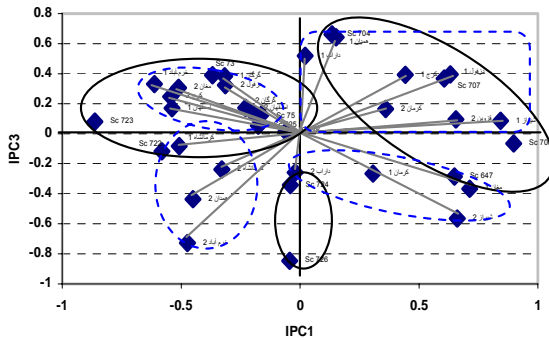


IPC IPC

(2000) Burak & Broccoli

×

IPC IPC1



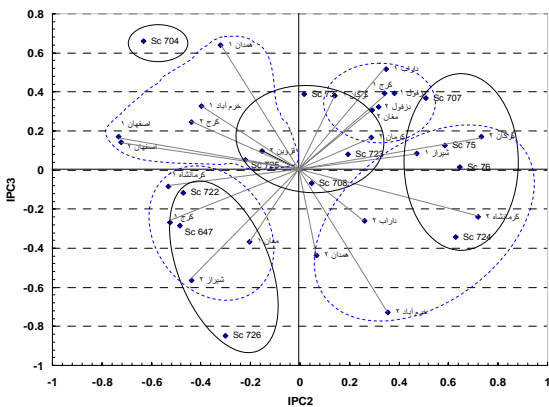
IPC IPC

(2001) Mohammadinejad

%

×

IPC IPC1



IPC IPC

IPC2 IPC1

SC SC SC

IPC
IPC1

()

(IPC3) (IPC1)

SC SC
()

SC

SC 708 SC 723 SC 725 SC 73

IPC IPC2

()

(2003) Shah Mohammdi

(2002) Mohammadinejad

%

%

×

×

(1997) Annicchiarico .

SC SC SC ×

IPC1 SC

SC SC SC × × ×

SC SC SC ×

SC SC F

FGH2 F

F

FGH₂

×

(1998) Fatahi et al.

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