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(Scheiner et al., 2002)

(*Helianthus annuus* L.)

(Weiss, 2000)

(Tyagi, 1988; Ortegon et al., 1992)

Shabana (1966) Putt

(1974)

(Khajehpour, 2004)

(Weiss, 2000)

"

(Putt, 1966; Ortegon et al., 1992)

(Tyagi, 1988;

(Weiss, 2000)

Putt

.Ortegon et al., 1992)

(1980) Miller et al. (1966)

(Weiss, 2000)

(Cecconi &

Blardine, 1991)

(Falconer & Mackay, 1996; Kearsy & Pooni,
.1996)

(Putt, 1966; Tyagi,

.1988; Bajaj et al., 1991)

(Falconer & Mackay, 1996; Kearsy & Pooni,
.1996)

(1988) Tyagi

CMS60/52 CMS19

() CMS26

CMS26 × CMS19 × R256

...

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(×)

R103

(Cochran & Cox, 1957)

.(Cochran & Cox, 1957)

pH

II

(Comstock & Robinson, 1948;

.Kearsey & Pooni, 1996)

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« »

(F₁)

(Comstock &

.Robinson, 1948)

(Falconer & Mackay ,1996;

.Kearsey & Pooni, 1996)

$$GCA_i = \bar{X}_{i..} - \bar{X}_{...}$$

$$GCA_j = \bar{X}_{.j.} - \bar{X}_{...}$$

$$SCA_{ij} = \bar{X}_{ij.} - \bar{X}_{...} - GCA_i - GCA_j$$

f1	CMS19	
f2	CMS60/52	()
f3	CMS26	
m1	B Ha 107F80-402	
m2	B Ha 107F80-414	
m3	B Ha 107F80-416	
m4	B Ha 107F80-423	
m5	B Ha 107F80-448	
m6	B Ha 107F80-465	
m7	B Ha 107F80-468	
m8	B Ha 107F80-491	
m9	B Ha 107F80-514	

N.M.R.

$\sigma_e^2 + r\sigma_{mf}^2 + m\sigma_r^2$	MS _r	r -	(r)
$\sigma_e^2 + r\sigma_{mf}^2 + f\sigma_M^2$	MS _m	m -	(M)
$\sigma_e^2 + r\sigma_{mf}^2 + m\sigma_f^2$	MS _f	f -	(F)
$\sigma_e^2 + r\sigma_{mf}^2$	MS _{fm}	(m -)(f -)	M × F
σ_e^2	MS _e	(mf)(r -)	

(Cochran & Cox, 1957)

(Weiss, 2000)

(1948) Comstock & Robinson

()

()

()

()

SCA

GCA

()

(Falconer & Mackay, 1996; Kearsley & Pooni, SCA GCA .1996)

(Marinkovic et al., 1988;

.Mihaljcevic, 1988)

/

Tyagi

.() f3

(1992) Hity (1988)

m9

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(Mihaljcevic, 1988)

m5

/

(Skoric et al., 1988)

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f1 f3

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/

.()

f3 × m7

.()

m4

(Kloczowski, 1971; Shabana,

.()

/ /

f2 × m8

1974)

(Mihaljcevic, 1988)

/

(Falconer &

.Mackay, 1996; Kearsley & Pooni, 1996)

(SCA)

() () () () () () () () () ()											
SCA	SCA	SCA	SCA	SCA	SCA	SCA	SCA	SCA	SCA	()	()
/	/	/	/	/	/	/	/	/	/	m	f1
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	f2
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	f3
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	
/	/	/	/	/	/	/	/	/	/	m	

()

(Mihaljcevic, 1988)

(Marinkovic et al., 1988; Putt, 1966)

$r = / *$

$r = /$

()

/ /

f3

SCA

GCA

...

:

$$\begin{matrix} & & (f3 \times m5) & & m5 & & / & / \\ & & (& / &) & & .(&) \\ .(&) & & / & / & & & \\ & & & & (f3 \times m5 & & &) \\ & & & & m5 & & .(&) \end{matrix}$$

(Marinkovic et al., 1988)

/ /

(Weiss, 2000)

/ /
/ /

M1

f1

.()

/ /

.() f2 × m9

()

(Mihaljcevic,

1988)

(Pathak, 1974; Shabana,

(Sindagi et al., 1979;

1974)

(Marinkovic et al., 1988)

Unrau & White, 1944)

/ /

(Laureti & Delgatto, 2001)

/ /

F1

SCA GCA

.()

.()

/ /

M5

"

(Mihaljcevic,

/

(Putt, 1966; Fick, 1975; Sindagi et al., 1979)

.1988)

/)

f2 f3

/

(/)

(

/

m5

f1 × m7

/ /

f2

) f3

(/ /) .()

/ / f2 × m1
m1 (Laureti & Delgatto, .()
m1 .() 2001)

() / /

() m5

()

/ /

f1 × m7 f1 × m1

f1 × m7

f1 × m1 SCA GCA
.() ()

()

"

"

()

"

r = / r = / **

/ r = /

f2 f3 r =

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