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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;

Putt

.Ortegon et al., 1992)

(1980) Miller et al. (1966)

(Weiss, 2000)

(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

(Cochran & Cox, 1957)

(Cochran & Cox, 1957)

$$\left(\begin{matrix} \dots \\ \dots \\ \dots \end{matrix} \right) \times \left(\begin{matrix} \dots \\ \dots \\ \dots \end{matrix} \right)$$

pH

II

(Comstock & Robinson, 1948;

.Kearsey & Pooni, 1996)

$$\left(\begin{matrix} \dots \\ \dots \\ \dots \end{matrix} \right)$$

« »

$$(F_1)$$

(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}	$(m -)(f -)$	$M \times F$
σ_e^2	MS_e	$(mf)(r -)$	

(Cochran & Cox, 1957)

(Weiss, 2000)

(1948) Comstock & Robinson

()

()

()

SCA

GCA

()

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

(Marinkovic et al., 1988;

Mihaljcevic, 1988)

Tyagi

/

() f3

(1992) Hity (1988)

m9

(Mihaljcevic, 1988)

m5

(Skoric et al., 1988)

f1 f3

()

f3 × m7

()

m4

(Kloczowski, 1971; Shabana,

1974)

()

f2 × m8

(Mihaljcevic, 1988)

(Falconer &

Mackay, 1996; Kearsley & Pooni, 1996)

...

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f1

()

/

/

.() m3

(Mihaljcevic, 1988)

(Ortegon et al., 1992)

/ /

f3 × m5

(1988) Mihaljcevic

.()

r= / r = / **

()

/	/	/	**	/	**	/	**	**	/	**	()
/	*	/	**	/	**	/	**	**	/	**	()
/	**	/	**	/	/	**	/	*	/	**	x
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/	/	/	**	/	**	/	**	/	**	/	GCA
/	/	/	**	/	**	/	/	/	*	/	SCA
/	/	/	**	/	**	/	/	/	/	/	SCA

** *

GCA

() () () () () ()

GCA	GCA	GCA	GCA	GCA	GCA	GCA	GCA	GCA	GCA	f
/	/	/	/	/	/	/	/	/	/	f
/	/	/	/	/	/	/	/	/	/	f
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/	/	/	/	/	/	/	/	/	/	m
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/	/	/	/	/	/	/	/	/	/	m
/	/	/	/	/	/	/	/	/	/	m
/	/	/	/	/	/	/	/	/	/	m

(SCA)

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

()

(Mihaljcevic, 1988)

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

r= / *

r= /

()

/ /

f3

SCA

GCA

...

:

(f3×m5 m5 / /
 (/) ()
 .() / /
 (f3×m5)
 m5 .()

(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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