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.(Naderi et al., 2007)

± ± ±

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 (Bahreini (Kargar, 2004)
 Behzadi, 1999; Kargar, 2004; Moradi Shahrabak et al., 2004) (Kargar, 2004)

Rashidi & Akhshi, 2007; Lasslo et al., 1985

(Sargolzaei & Edriss, 2004)

(Jurado et al., 1994) ...

$$y_{ijklm} = \mu + B_i + D_j + S_k + T_l + \alpha (Ag_{ijklm} - \bar{Ag}) + e_{ijklm}$$

μ) y_{ijklm} i B_i) j D_j () k S_k () l T_l () Ag_{ijklm} α (

(van Wyk et al., 1993)

(2008) Rashidi & Akhshi .

\bar{Ag}

±

e_{ijklm}

± ±

(2008) Sargolzaei & Edriss

/ ± / / ± / / ± /

(2004) Shaat et al. .

±

(Neser et al., 2000)

DFREML

:(Meyer, 2000)

$$\begin{aligned}
 y &= Xb + Z_a a + e & (\\
 y &= Xb + Z_a a + Z_{pe} pe + e & (\\
 y &= Xb + Z_a a + Z_m m + e & (\\
 \text{Cov}(a, m) &= 0 & (\\
 y &= Xb + Z_a a + Z_m m + e & (\\
 \sigma_{am} \text{Cov}(a, m) &= A & (\\
 y &= Xb + Z_a a + Z_m m + Z_{pe} pe + e & (\\
 \text{Cov}(a, m) &= 0 & (\\
 y &= Xb + Z_a a + Z_m m + Z_{pe} pe + e & (\\
 \sigma_{am} \text{Cov}(a, m) &= A & (
 \end{aligned}$$

SAS

$$\begin{aligned}
 & \quad \quad \quad b \quad \quad \quad y \\
 a & \left(\quad \quad \quad \right) \\
 & \quad \quad \quad m \\
 & \quad \quad \quad pe \\
 & \quad \quad \quad Z_m \quad Z_{pe} \quad Z_a \quad X \\
 m \quad pe \quad a \quad b \\
 A & \quad \quad \quad y \\
 & \quad \quad \quad \sigma_{am}
 \end{aligned}$$

(P < /)

(Bahreini Behzadi, 1999; Hanford et al., 2003; Kargar, 2004; Moradi .Shahrbabak et al., 2004)

(P < /)

(Maria et al., 1993; .Snyman et al., 1995; Bahreini Behzadi, 1999)

.(Miraei-Ahtiani et al., 2008; Snyman et al., 1995)

(P < /)

.(Maria et al., 1993; Kargar, 1994)

.(Naderi et al., 2007)

1- Likelihood ratio test

				()	()
**	**	**	**	/ /	/ ± /
**	**	**	**	/ /	/ ± /
ns	**	**	**	/ - /	/ ± /
ns	**	**	**	/ - /	/ ± /
ns	**	**	**	/ - /	/ ± /

P > 0.05 : ns P < 0.05 : **

*

/	/	/	/	/	h^2_d
/	/	/	/	/	$h^2_d + pe^2$
/	/	/	/	/	$h^2_d + h^2_m$
/	/	/	/	/	$h^2_d + h^2_m + r_{am}$
/	/	/	/	/	$h^2_d + h^2_m + pe^2$
/	/	/	/	/	$h^2_d + h^2_m + r_{am} + pe^2$
= pe^2	= h^2_m	= h^2_d		= r_{am}	*

Shaat et al. / /

pe . (2004) (Nasholm & Danell, 1996; Moradi Shahrbabak et al., 2004)

(2007) Naderi et al. /

/

pe (2004) Moradi Shahrbabak et al. .

/

(2004) Kragar / (Rashidi & Akhshi, 2007)

. (/) (Naderi et al., 2007)

.(Bahreini Behzadi, 1999; Naderi et al., 2007) /

/ pe (Notter, 1998; Bahreini Behzadi, 1999; Moradi Shahrbabak et al., 2004)

(2008) Miraei-Ashtiani et al. .

(2007) Naderi et al. (/) (pe)

. (/) /

.(Nasholm & Danell, 1996; Naser et al., 2000)

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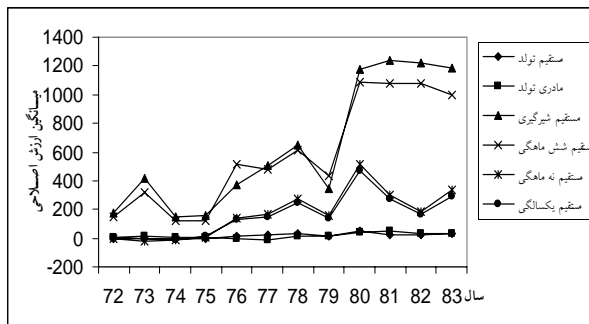
/ ± / *	/ ± / ns	/ ± / ns	/ ± / ns
/ ± / *	/ ± / ns	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns
	/ ± / **	/ ± / ns	/ ± / ns

P>0.05 : ns P<0.05 : * P<0.01 : **

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(Lasslo et al., 1985; Sargolzaei & Edriss, 2004; Rashidi & Akhshi, 2007)

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(Rashidi & Akhshi,

2007)

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