



Genetic and phenotypic correlation among milk production traits of Gir triple cross cows

M.N. PATOND AND U.Y. BHOITE

ABSTRACT : The genetic correlation of LMY with 300DMY, PY and DAPY was significant ($P < 0.01$) and positive (0.880, 0.939, 0.671), respectively. The genetic correlation of 300DMY with PY and DAPY was positive and significant ($P < 0.01$) (0.863 and 0.843), respectively. The genetic correlation between PY and DAPY was (0.594) significant ($P < 0.01$). The genetic correlation of LL with LMY, 300DMY, PY and DAPY was negative and significant ($P < 0.01$) -0.388, -0.452, -0.693 and -0.411, respectively. The phenotypic correlation of LMY with 300 DMY, PY and DAPY were positive and significant ($P < 0.01$) 0.340, 0.430 and 0.242, respectively. The phenotypic correlation between LMY and LL was non-significant (0.007). The phenotypic correlation of 300 DMY with PY and DAPY were highly significant (0.288 and 0.202), respectively. The phenotypic correlation of LL with 300 DMY and PY was (0.063 and -0.101) significant ($P < 0.05$). The phenotypic correlation between LL and DAPY was negative and non-significant (-0.054). The phenotypic correlation between PY and DAPY was (0.202) positive and significant ($P < 0.01$).

KEY WORDS : Genetic correlation, Phenotypic correlation, Milk production traits, Gir triple cross cows

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India possesses a large number of non-descript livestock population with poor genetic potential. To overcome this problem, the introduction of exotic germplasm has been widely accepted as a tool to improve the milk producing ability of indigenous cattle. In animal breeding selection and culling are the important ways to increase yield from each animals. For that the knowledge of genetic and phenotypic correlation of different milk production traits namely lactation milk yield (LMY), 300 days milk yield (300 DMY), lactation length (LL), peak milk yield (PMY) and days to attain peak milk yield (DAPMY) must known. Therefore, the present research was undertaken with the object to study the genetic and phenotypic correlation among milk production traits of Gir triple cross cows.

The observations regarding the milk production traits of

410 Gir triple cross cows and 33 sires were collected from the pedigree sheets and daily milk recording sheets over a period of 35 years (1977 to 2011) maintained at RCDP on Cattle, Mahatma Phule Krishi Vidyapeeth, Rahuri. The genetic and phenotypic correlations among various milk production traits were calculated from the analysis of variance and covariance among sire groups as given by Becker (1975). The significance of phenotypic and genetic correlation was tested by correlation table (Fisher and Yates, 1963).

The genetic and phenotypic correlations among different milk production traits are presented in Table. 1. In Gir triple cross cows genetic correlations of 300 days milk yield (0.880), lactation length (0.388), peak milk yield (0.939) and days to attain peak milk yield (0.671) with lactation milk yield were positive and significant ($P < 0.01$). These results were closely agreement with Gawari (1999) in triple crossbred cows, Kumar and Singh (2006) in Karan Fries cows and Portillo and Pollott (2008) in HF cows.

The phenotypic correlations of 300 days milk yield (0.340), peak milk yield (0.430) and days to attain peak milk yield (0.242) with lactation milk yield were positive and significant ($P < 0.01$). However, the phenotypic correlation of lactation length with

MEMBERS OF RESEARCH FORUM

Address for correspondence :

M.N. Patond, Department of Animal Science and Dairy Science, Anand Niketan College of Agriculture, WARORA (M.S.) INDIA
Email : mukundpatond@gmail.com

Associated Authors' :

U.Y. Bhoite, Department of Animal Science and Dairy Science, Anand Niketan College of Agriculture, WARORA (M.S.) INDIA

Table 1: Genetic and phenotypic correlation among milk production traits of gir triple cross cow

Traits	LMY	300 DMY	LL	PMY	DAPY
LMY		0.340**	0.007	0.430**	0.242**
300 DMY	0.880**		0.063*	0.288**	0.202**
LL	-0.388**	-0.452**		-0.101*	-0.054
PY	0.939**	0.863**	-0.693**		0.202**
DAPY	0.671**	0.843**	-0.411**	0.594**	

Figures above diagonal are phenotypic correlation and below are genetic correlations, *and** indicate significance of values at P=0.05 and 0.05, respectively

lactation milk yield was low (0.007) and non-significant. Similar positive phenotypic correlations were reported by Rahumathulla *et al.* (1993) in J x Red Sindhi crossbreds, Tomar *et al.* (1999) in crossbred cows, Portillo and Pollott (2008) in HF cows and Nikam (2010) in Phule Triveni cows. Portillo and Pollott (2008) in HF cows observed very strong phenotypic correlation between PY and LMY and Shubha Lakshmi *et al.* (2009) observed very low phenotypic correlation between PY and LMY in HF x Sahiwal cows than the present investigation.

The genetic correlation of lactation length (0.452), peak milk yield (0.863) and days to attain peak milk yield (0.843) with 300 DMY was positive and significant (P < 0.01). Similar genetic correlation between peak yield and 300 DMY was observed by Gawari (1999) in triple crossbred cows and Tomar *et al.* (1999) in crossbred cows.

The phenotypic correlations of peak milk yield (0.288) and days to attain peak milk yield (0.202) with 300 DMY was positive and significant (P < 0.01). However, phenotypic correlation between lactation length and 300 DMY was (0.063) positive and significant (P < 0.05). Palia and Arora (1983) reported positive and highly significant phenotypic correlation between peak yield and 305 days milk yield in Jersey cows, Tomar *et al.* (1999) in crossbred cows also reported similar phenotypic correlation between peak yield and 300 DMY. Shubha Lakshmi *et al.* (2009) observed high phenotypic correlation between lactation length and 300 DMY in HF x Sahiwal cows than present results.

The genetic correlation of peak milk yield (-0.693) and days to attain peak milk yield (-0.411) with lactation length was negative and significant (P < 0.01) in Gir triple cross cows. Similar results were reported by Kumar *et al.* (1992) in Haryana cows. However, Gawari (1999) in triple crossbred cows reported contradictory results.

The phenotypic correlation of lactation length was significant (P < 0.05) and negative with peak milk yield (-0.101). The phenotypic correlation of lactation length and days to attain peak milk yield was non-significant and negative (-0.054) in present investigation. However, Tomar *et al.* (1999) reported positive phenotypic correlation of lactation length and peak yield in crossbred cattle.

In Gir triple cross cows genetic correlation of peak milk yield with days to attain peak milk yield (0.594) was positive and significant (P < 0.01). However, Gawari (1999) and Portillo and Pollott (2007) reported negative genetic correlation between peak milk yield and days to attain peak milk yield in triple crossbred cattle and HF cows, respectively.

The peak milk yield was positively (0.202) and significantly (P < 0.01) correlated with days to attain peak milk yield in present study. These results were supported by Portillo and Pollott (2007) in HF cows.

Conclusion:

The milk production traits which are significant positive genetically and phenotypically correlated are considered for selection criteria to improve the production ability in Gir triple cross cows.

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