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Wagh RU

Ph.D. Scholars, Department of
Animal Husbandry and Dairy
Science Vasant Rao Naik
Marathwada Krishi Vidyapeeth,
College of Agriculture, Parbhani,
Maharashtra, India

Thombre BM

Department of Animal
Husbandry and Dairy Science
Vasant Rao Naik Marathwada
Krishi Vidyapeeth, College of
Agriculture, Parbhani,
Maharashtra, India

Londhe GK

Department of Animal
Husbandry and Dairy Science
Vasant Rao Naik Marathwada
Krishi Vidyapeeth, College of
Agriculture, Parbhani,
Maharashtra, India

Corresponding Author:**Wagh RU**

Ph.D. Scholars, Department of
Animal Husbandry and Dairy
Science Vasant Rao Naik
Marathwada Krishi Vidyapeeth,
College of Agriculture, Parbhani,
Maharashtra, India

Studies on productive performance of Gaolao Cattle in the breeding tract of Maharashtra

Wagh RU, Thombre BM and Londhe GK

Abstract

The productive performance of Gaolao cattle were studied at different location in the breeding tract. The idea behind the collection of data in breeding tract of Gaolao cattle from the farmers and breeder heard of Gaolao rather than on the organized farm to obtain the real picture of productive performance of breed in the breeding tract. The productive traits often help in judging the economic value of the animal. In present finding the overall least square means for lactation milk yield (LMY) of Gaolao cattle was recorded as 520.79 ± 6.20 kg. The effect of block and colour was found non-significant on lactation milk yield (LMY) of Gaolao cattle. The overall least square means for peak milk yield (PMY) of Gaolao cattle was recorded as 3.10 ± 0.03 kg. The effect of block was found highly significant on peak milk yield (PMY) whereas, the effect of colour was found non-significant. The overall least square mean for days to reach peak milk yield (DRPMY) of Gaolao cattle was recorded as 34.49 ± 0.44 days. The effect of block and colour was found non-significant on days to reach peak milk yield (DRPMY) of Gaolao cattle. The overall least square mean for lactation period (LP) of Gaolao cattle was recorded as 254.51 ± 1.17 days. The effect of block was found significant on lactation period (LP) whereas, the effect of colour was found non-significant. The overall least square mean for dry period (DP) of Gaolao cattle was recorded as 172.71 ± 0.90 days. The effect of block was found significant on dry period (DP) whereas, the effect of colour was found non-significant. The improvement in productive characteristics of indigenous breed has become essential to make economically viable dairy animal.

Keywords: Productive performance, lactation milk yield, peak milk yield, days to reach peak milk yield, lactation period, economic value

1. Introduction

The Gaolao is the famous breed of the Vidarbha region of Maharashtra state. Gaolao is average milking breed and a very popular breed for drought among farmer (Patil *et al*, 2005)^[7]. The Productive performance of animals depends on productive characteristics, which play an important role for evaluation of animal.

The productive characteristics like Lactation milk yield (LMY), Peak milk yield (PMY), Days to reach peak milk yield (DRPMY), Lactation period (LP) and Dry period (DP) were taken into consideration for present study. Gaolao cattle fit into the group of short and stumpy horned, body is medium height narrow in frame, female are of pure white in colour and males gray over the head and hump, with a long coffin-shaped skull, face markedly long and narrow tapering towards muzzle. The Gaolao breed eyes are almond shaped and ears are medium sized, carried high giving an alert appearance to the head and forehead is slightly convex appearance. In the breeding tract, among the Gaolao population, colour varies from light to milky white. The Gaolao is average milking breed and producing 470-725 kg, milk per lactation. It is also observed that, the native home of the breed is located along the route taken by Rig Vedic Aryans from the Northern passes through central India to the South. Therefore, the present study has been following objective:

1. To study the productive characteristics
2. To study the colour pattern effect on various characteristics
3. To study the block effect on various characteristics

2. Material and Methods

In present study the data on productive characteristics i.e. lactation milk yield (LMY), Peak milk yield (PMY), days to reach peak milk yield (DRPMY), lactation period (LP) and dry period (DP) were collected by actual interview with the Gaolao owners with the help of model questionnaire. The collected data was classified as per colour pattern (*viz.*, White colour followed by Yellowish White and Grayish White). The data on productive traits were collected from different block of Vidarbha region of Maharashtra as mention below.

Table 1: List of villages randomly selected for collection of data

Sr. No.	Name of District	Name of Block	Name of Villages
1	Wardha	Arvi (B ₁)	Chincholi, Danapur, Kharangna, Kinhal (Bothali), Pachod, Talegaon (Raghugi)
		Karanja (B ₂)	Bhiwapur Heti, Dharti, Heti Kundi, Jaurwada, Kannamwar Gram, Selgaon
		Selu (B ₃)	Akoli, Antargaon, Jamni, Madani, Masala, Zadsi
		Wardha (B ₄)	Ashtaa, Bhankheda, Bhugaon, Jaulgaon, Selukate, Zanzapur
2	Nagpur	Katol (B ₅)	Chandanpardi, Khandala, Murti, Parsoda, Sawanga, Walni

2.1 Productive characteristics

The analysis of data was done by method of Least Square Technique as outlined by Harvey (1990) [4]. The following mathematical model will be employed to analyze the data.

$$Y_{ijlm} = \mu + B_i + C_j + O_l + e_{ijlm}$$

Where,

Y_{ijlm} = is the record of m^{th} Gaolao individual in i^{th} block, j^{th} colour and l^{th} off-type

μ = is the population mean common to all the observations.

B_i = is the effect of i^{th} block of individual.

C_j = is the effect of j^{th} colour of individual.

O_l = is the effect of l^{th} off-type of individual.

The significant effect was further analyzed to have all pair wise comparison by Duncan's Multiple Range Test (DMRT) as modified by Kramer (1957) [6].

3. Results and Discussion

3.1. Productive characteristics

3.1.1 Lactation milk yield (LMY)

It was observed from Table 2 that the overall least squares mean for lactation milk yield (LMY) of Gaolao cattle was recorded as 520.79 ± 6.20 kg in present study which was agreement with Kotheekar *et al.* (2006) [5] reported as 516.8 ± 18.68 , 501.07 ± 16.61 , 519 ± 15.75 , 535.28 ± 21.25 and

583.02 ± 38.45 kg in I, II, III, IV and V lactation in Gaolao cattle, respectively. The higher lactation milk yield than the present result was reported by Dhumal *et al.* (1989) [3] as 646.00 kg in Red Kandhari cattle, respectively. The lower lactation milk yield than the present result was reported by Bainwad *et al.* (2017) [1] reported as 417.28 ± 1.09 kg in Red Kandhari cattle, respectively.

3.1.2 Block effect on lactation milk yield

The difference observed in the LSMs for PMY of Gaolao cattle was non-significant due to block effect. The LSM for LMY of Gaolao cattle in block B₁, B₂, B₃, B₄ and B₅ were 521.40 ± 9.53 , 519.53 ± 9.21 , 516.41 ± 9.08 , 522.63 ± 10.09 and 523.87 ± 9.21 kg, respectively. The LSM for LMY of Gaolao cattle recorded in B₅ was higher to that of recorded in B₁, B₂, B₃ and B₄ which also differed non-significant from each other.

3.1.3 Colour pattern effect on lactation milk yield

The differences observed in the LSMs for LMY of Gaolao cattle were non-significant due to colour pattern effect. The LSM for LMY of Gaolao cattle for colour pattern C₁, C₂ and C₃ were 527.97 ± 3.88 , 524.53 ± 11.01 and 509.87 ± 14.47 kg, respectively. The LSM for LMY of Gaolao cattle recorded in C₁ was higher to that of recorded in C₂, which differed non-significant from each other.

Table 2: Least squares means for lactation milk yield (LMY) as affected by block and colour pattern in Gaolao cows

Sources	Code	N	Lactation milk yield (Kg) LSM \pm SE
Population mean	μ	370	520.79 ± 6.20
Effect of Block			
Arvi	B ₁	68	521.40 ± 9.53
Karanja	B ₂	80	519.53 ± 9.21
Selu	B ₃	77	516.41 ± 9.08
Wardha	B ₄	60	522.63 ± 10.09
Katol	B ₅	85	523.87 ± 9.21
Effect of Colour			
White	C ₁	310	527.97 ± 3.88
Yellowish white	C ₂	38	524.53 ± 11.01
Grayish white	C ₃	22	509.87 ± 14.47

3.2.1 Peak milk yield (PMY)

It was observed from Table 3 that the overall least square mean for peak milk yield (PMY) of Gaolao cattle was recorded as 3.10 ± 0.03 kg in the present study which was in agreement with Kotheekar *et al.* (2006) [5] as 3.16 ± 0.05 kg in Gaolao cattle, respectively. The lower peak milk yield than the present result was reported by Siddiqui *et al.* (2000) [9] reported as 2.27 ± 0.35 kg and Bainwad *et al.* (2017) [1] 2.63 ± 0.01 kg in Red Kandhari cattle.

3.2.2 Block effect on peak milk yield

The difference observed in the LSMs for PMY of Gaolao cattle was highly significant due to block effect. The LSM for PMY of Gaolao cattle in block B₁, B₂, B₃, B₄ and B₅ were 2.97 ± 0.04 , 3.17 ± 0.04 , 2.92 ± 0.04 , 3.12 ± 0.05 and $3.31 \pm$

0.05 kg, respectively. The LSM for PMY of Gaolao cattle recorded in B₅ was higher to that of recorded in B₁, B₂, B₃ and B₄ which also differed highly significant from each other. The DMRT revealed that Gaolao cattle maintained at B₅ block had significantly higher PMY over other blocks.

3.2.3 Colour pattern effect on peak milk yield

The differences observed in the LSMs for PMY of Gaolao cattle were non-significant due to colour pattern effect. The LSM for PMY of Gaolao cattle for colour pattern C₁, C₂ and C₃ were 3.07 ± 0.02 , 3.15 ± 0.05 and 3.07 ± 0.07 kg, respectively. The LSM for PMY of Gaolao cattle recorded in C₂ was higher to that of recorded in C₁ and C₃ which differed non-significant from each other.

Table 3: Least squares means for peak milk yield (PMY) as affected by block and colour pattern in Gaolao cows

Sources	Code	N	Peak milk yield (Kg) LSM \pm SE
Population mean	μ	370	3.10 \pm 0.03
Effect of Block			
Arvi	B ₁	68	2.97 ^a \pm 0.04
Karanja	B ₂	80	3.17 ^b \pm 0.04
Selu	B ₃	77	2.92 ^a \pm 0.04
Wardha	B ₄	60	3.12 ^b \pm 0.05
Katol	B ₅	85	3.31 ^{bc} \pm 0.05
Effect of Colour			
White	C ₁	310	3.07 \pm 0.02
Yellowish white	C ₂	38	3.15 \pm 0.05
Grayish white	C ₃	22	3.07 \pm 0.07

Note: Means connected by superscript do not differ significantly.

3.3.1 Days to reach the peak milk yield (DRPMY)

It was observed from Table 4 that the overall least square mean for days to reach peak milk yield (DRPMY) of Gaolao cattle was recorded as 34.49 \pm 0.44 days. The slightly higher days to reach the peak milk yield than the present result has been reported by Salunkhe (2007) [8] as 36.39 \pm 0.48 days, Bhutkar (2014) [2] as 44.81 \pm 2.52 kg in Deoni cattle at CCBP, Parbhani and Bainwad *et al.* (2017) [1] as 39.48 \pm 0.09 days in Red Kandhari cattle, respectively.

3.3.2 Block effect on days to reach the peak milk yield

The difference observed in the LSMs for DRPMY of Gaolao cattle was non-significant due to block effect. The LSM for DRPMY of Gaolao cattle in block B₁, B₂, B₃, B₄ and B₅ were 33.25 \pm 0.67, 34.59 \pm 0.65, 35.06 \pm 0.64, 34.80 \pm 0.71 and 34.73 \pm 0.65 days, respectively. The LSM for DRPMY of Gaolao cattle recorded in B₃ was higher to that of recorded in B₁, B₂, B₄ and B₅ which differed non-significant from each other.

3.3.3 Colour pattern effect on days to reach the peak milk yield

The differences observed in the LSMs for DRPMY of Gaolao cattle were non-significant due to colour pattern effect. The LSM for DRPMY of Gaolao cattle for colour pattern C₁, C₂ and C₃ were 34.56 \pm 0.27, 33.66 \pm 0.78 and 35.24 \pm 1.02 days, respectively. The LSM for DRPMY of Gaolao cattle recorded in C₃ was higher to that of recorded in C₁ and C₂, which differed non-significant from each other.

Table 4: Least squares means for days to reach the peak milk yield (DRPMY) as affected by block and colour pattern in Gaolao cows

Sources	Code	N	Days to reach the Peak milk yield (Days) LSM \pm SE
Population mean	μ	370	34.49 \pm 0.44
Effect of Block			
Arvi	B ₁	68	33.25 \pm 0.67
Karanja	B ₂	80	34.59 \pm 0.65
Selu	B ₃	77	35.06 \pm 0.64
Wardha	B ₄	60	34.80 \pm 0.71
Katol	B ₅	85	34.73 \pm 0.65
Effect of Colour			
White	C ₁	310	34.56 \pm 0.27
Yellowish white	C ₂	38	33.66 \pm 0.78
Grayish white	C ₃	22	35.24 \pm 1.02

3.4.1 Lactation period (LP)

It was observed from Table 5 that the overall least square mean for lactation period (LP) of Gaolao cattle was recorded

as 254.51 \pm 1.17 days. The lower lactation period than the present result has been reported by Kothekar *et al.* (2006) [5] as 249.18 \pm 2.65 days in Gaolao cattle and Bainwad *et al.* (2017) [1] as 242.64 \pm 0.46 days in Red Kandhari cattle, respectively. The DMRT revealed that Gaolao cattle maintained at B₂ block had significantly higher LP over other blocks.

3.4.2 Block effect on lactation period

The difference observed in the LSMs for LP of Gaolao cattle was significant due to block effect. The LSM for LP of Gaolao cattle in block B₁, B₂, B₃, B₄ and B₅ were 253.99 \pm 2.63, 257.24 \pm 2.55, 248.81 \pm 2.51, 256.86 \pm 2.79 and 255.64 \pm 2.55 days, respectively. The LSM for LP of Gaolao cattle recorded in B₂ was higher to that of recorded in B₁, B₃, B₄ and B₅ which differed significant from each other. The DMRT revealed that Gaolao cattle maintained at B₂ block had significantly higher LP over other block.

3.4.3 Colour pattern effect on lactation period

The differences observed in the LSMs for LP of Gaolao cattle were non-significant due to colour pattern effect. The LSM for LP of Gaolao cattle for colour pattern C₁, C₂ and C₃ were 256.00 \pm 1.07, 258.75 \pm 3.04 and 258.77 \pm 4.00 days, respectively. The LSM for LP of Gaolao cattle recorded in C₃ was higher to that of recorded in C₁ and C₂ which differed non-significant from each other.

Table 5: Least squares means for lactation period (LP) as affected by block and colour pattern in Gaolao cows

Sources	Code	N	Lactation period (Days) LSM \pm SE
Population mean	μ	370	254.51 \pm 1.17
Effect of Block			
Arvi	B ₁	68	253.99 ^a \pm 2.63
Karanja	B ₂	80	257.24 ^a \pm 2.55
Selu	B ₃	77	248.81 ^{ab} \pm 2.51
Wardha	B ₄	60	256.86 ^a \pm 2.79
Katol	B ₅	85	255.64 ^a \pm 2.55
Effect of Colour			
White	C ₁	310	256.00 \pm 1.07
Yellowish white	C ₂	38	258.75 \pm 3.04
Grayish white	C ₃	22	258.77 \pm 4.00

Note: Means connected by superscript do not differ significantly.

3.5.1 Dry period (DP)

It was observed from Table 6 that the overall least square mean for dry period (DP) of Gaolao cattle was recorded as 172.71 \pm 0.90 days. The lower days dry period than the present result has been reported by Kothekar *et al.* (2006) [5] as 125.25 \pm 1.37 days in Gaolao cattle. The higher days dry period than the present result has been reported by Bainwad *et al.* (2017) [1] as 180.79 \pm 0.56 days in Red Kandhari cattle, respectively.

3.5.2 Block effect on dry period

The difference observed in the LSMs for DP of Gaolao cattle was highly significant due to block effect. The LSM for DP of Gaolao cattle in block B₁, B₂, B₃, B₄ and B₅ were 170.14 \pm 1.38, 172.20 \pm 1.33, 178.06 \pm 1.31, 169.94 \pm 1.46 and 173.21 \pm 1.33 days, respectively. The LSM for DP of Gaolao cattle recorded in B₃ was higher to that of recorded in B₁, B₂, B₄ and B₅ which differed highly significant from each other. The DMRT revealed that Gaolao cattle maintained at B₃ block had significantly higher DP over other blocks.

3.5.3 Colour pattern effect on dry period

The differences observed in the LSMs for DP of Gaolao cattle were non-significant due to colour pattern effect. The LSM for DP of Gaolao cattle for colour pattern C₁, C₂ and C₃ were 172.88 ± 0.56 , 170.88 ± 1.59 and 174.38 ± 2.10 days, respectively. The LSM for DP of Gaolao cattle recorded in C₃ was higher to that of recorded in C₁ and C₂ which differed non significant from each other.

Table 6: Least squares means for dry period (DP) as affected by block and colour pattern in Gaolao cows

Sources	Code	N	Dry period(Days) LSM \pm SE
Population mean	μ	370	172.71 ± 0.90
Effect of Block			
Arvi	B ₁	68	$170.14^a \pm 1.38$
Karanja	B ₂	80	$172.20^a \pm 1.33$
Selu	B ₃	77	$178.06^b \pm 1.31$
Wardha	B ₄	60	$169.94^a \pm 1.46$
Katol	B ₅	85	$173.21^{ac} \pm 1.33$
Effect of Colour			
White	C ₁	310	172.88 ± 0.56
Yellowish white	C ₂	38	170.88 ± 1.59
Grayish white	C ₃	22	174.38 ± 2.10

Note: Means connected by superscript do not differ significantly.

Conclusion

The effect of block was found significant to highly significant on Peak milk yield (PMY), Lactation Period (LP) and Dry Period (DP) whereas the effect of colour was found non-significant on all productive characteristics of Gaolao cattle. Hence it is concluded that the management practices, available water and feed resources and climatic condition followed there plays an important role on productive performance of Gaolao cattle.

References

- Bainwad DV, Thombre BM, Siddiqui MF, Chauhan DS, Londhe GK, Shinde AT. Studies on Morphometric, Production and Reproduction Performance of Red Kandhari Cattle in Marathwada Region. Ph.D (Agri.) Thesis Submitted to VNMKV, Parbhani (MS), 2017.
- Bhutkar SS. Studies on Economic Characteristics of Deoni and Holstein Friesian x Deoni (Holdeo). Ph.D (Agri.) Thesis Submitted to VNMKV, Parbhani (MS), 2014.
- Dhumal MV, Sakhare PS, Deshpande KS. Factors Affecting Lactation Milk Yield and Lactation Length in Red Kandhari and Crossbred Cows. Indian J. Dairy. Sci. 1989; 42(1):102-104.
- Harvey WR. Least Squares Analysis of Data with Unequal Subclass Numbers, Agricultural Research Service, United State, Department of Agriculture, Washington, D.C, 1990.
- Kothekar MD, Pundir RK, Singh PK, Singh G. Cattle Genetics Resources of India Gaolao, National Bureau of Animal Genetic Resources, Karnal and Nagpur Veterinary College, Maharashtra Animal and Fishery Science University, Nagpur, 2006.
- Kramer CY. Extension of Multiple Range Tests to Group Corrected Adjusted Means. 1957; 13:13-18.
- Patil SR, Gumpawar AS, Jadhav ER, Mathure KHL. Morphological Characteristic of Gaolao Breed. Indian Vet. J. 2005; 82(4):430-31.

- Salunkhe MS. Study on Productive and Reproductive Performance of Deoni Cattle. M.Sc. (Agri.) Thesis Submitted to MAU, Parbhani (MS), 2007.
- Siddiqui MF, Auradakar SK, Dhumal MV. Characteristics and Development of Red Kandhati Cattle Breed. Project Report Submitted to MAU, Parbhani (MS), 2000.