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Morphological characterization of non-descript Buffalo in Konkan region of Maharashtra state

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Abstract

The present investigation entitled “Morphological Characterization of Non-Descript Buffalo in Konkan Region of Maharashtra State.” was undertaken with the objectives to study the morphological characteristics, milk production performance, reproductive performance, disease incidence, mortality and morbidity, management practices and feeds and feeding of non-descript buffaloes of the Konkan region. For survey, four districts viz., Thane, Palghar, Ratnagiri and Sindhudurg of the Konkan region of Maharashtra were selected. The total sample size of 500 buffalo owners with 850 non-descript buffalo was considered for sample survey. The data were collected by personal interview and by taking measurements of the non-descript buffaloes. The animals were medium in size having coat colours observed were black and brown in proportion of 58.94 and 41.06 percent and 49.18, 46.94 and 3.88 percent non-descript buffaloes of the Konkan region had black, brown and white muzzle colour, respectively. Eye colour observed were black, brown and white in 76.47, 22.24 and 1.29 percent and eyelid colour observed were black and brown in 87.68 and 12.32 percent. Horn and hooves colour were mainly both brown colour with 63.28 and 65.06 percent. The shape of horn curved in backward with 24.71 percent and straight in backward direction in 26.94 percent was most common. The horn was mostly in sword like orientation having 51.06 percent and the orientation of ear were having horizontal followed by drooping ear with 78.00 and 22.00 percent. The udder was medium in size showing different shape like bowl 32.81 percent, pendulous 18.557 percent and rounded 48.48 percent. In non-descript male small sheath flap and medium naval flap in female was mostly observed.

The non-descript buffalo were medium sized having average head length, ear length, horn length, circumference at the base of horn, neck length, height at wither, chest girth, body length, body weight, hind leg length, tail length and switch of tail length in adult buffaloes was 47.80±1.69 cm, 24.35±0.20 cm, 54.11±0.23 cm, 23.72±0.75 cm, 46.42±0.14 cm, 127.66±0.15 cm, 185.42±0.28 cm, 127.89±0.14 cm, 3459.6±1.28 kg, 86.65±0.3 cm, 84.08±0.25 cm and 9.38±0.02 cm, respectively.

Keywords: Morphological characters, Konkan region, non-descript, buffaloes

Introduction

The buffalo population in the Konkan region was rarely employed just to obtain female buffalo for milk production. Female buffaloes are a source of milk production, so it's important to improve the non-descript buffalo population for milk and work purposes in Konkan region. It will aid in the establishment of sustainable agriculture and employment in the region.

The agroclimatic condition of the Konkan region are typical owing to high rainfall, hot and humid climate and hilly terrain. This has impact on physiological and structural adoption of cattle and buffaloes in this region. Non-descript buffalo population of the Konkan region of Maharashtra state exhibit tremendous variation in characterization and production performance. So, far no such survey has been carried out in Konkan region.

As a first step in the process, it is necessary to conduct study on morphological characterization of the existing non-descript buffalo population and its link with production performance through a sample survey in terms of selecting the permissible animal for further development.

Material and Methods

The data on morphological characteristics of non-descript buffaloes from Palghar, Thane, Ratnagiri and Sindhudurg districts was collected using a three-stage stratified random sampling method. In the first stage, five tehsils were randomly selected from the proposed districts under study *viz.*, Palghar, Thane, Ratnagiri and Sindhudurg districts and five villages were randomly selected from each tehsil in the second stage. In the third stage, five farmers with buffalo from each village were chosen at random. Thus, total sample size was five hundred (500) buffalo owners.

The data was collected using a set of questionnaires that were adapted to study the objectives. The data was collected by a sample survey method. Before the actual data collection, the questionnaires were pretested. The information was collected through personal interview with the farmer as well as the measurements of morphological parameters of the non-descript buffaloes. The data collected were properly arranged, grouped and were analysed by using mean, average and standard error with statistical techniques.

Results and Discussion

Morphological characters

Colour of body parts

Coat colour: The coat colours observed were black and brown colour in the proportion of 58.94 and 41.06 percent, respectively. These results indicated that black colour was prominent. The findings are in accordance with Thalkar *et al.* (2016) ^[9] who reported that the majority buffaloes in Akot tahsil exhibited black body coat colour, while remaining buffaloes had brown body coat colour was black, 7.69 percent were grey and 5.13 percent were brown-coloured buffaloes. The highest percentage of buffaloes both in Lal Teer and BLRI buffalo herd were having jet black (56%) and black (88%) colour, respectively.

Muzzle colour: The muzzle colour observed was 49.18 percent black, 46.94 percent brown and 3.88 percent white percent in non-descript buffaloes of the Konkan region. The results indicated that black muzzle colour was the most common in non-descript buffaloes of present investigation. Gubbawar (2008) ^[4] observed similar result who noted that majority of the buffalo population (72.40%) possessed black muzzle, though substantial number of buffaloes (27.60%) had brown muzzle. These results agreed with Rahman *et al.* (2015) ^[7] in indigenous buffalo and Thalkar *et al.* (2016) ^[9] in Nagpuri buffalo.

Eye colour: Eyes colour observed were black, brown and white in 76.47, 22.24 and 1.29 percent, animals respectively. This indicated that most of the non-descript buffaloes in the Konkan region were having black eye colour. Similar findings were reported by Rahman *et al.* (2015) ^[7] who indicated that eye colour was mainly black of indigenous buffalo in Sylhet district, but Thalkar *et al.* (2016) ^[9] observed that 60.40 percent buffaloes had creamy white colour eyes, while 18.00 percent buffaloes had brown eyes and 21.60 percent buffaloes were having coloured patches in eye of Purnathadi strain of Nagpuri buffaloes.

Eyelid colour: The eyelid colours observed were black (87.68%) and brown (12.32%). This showed that most of the non-descript buffaloes in the region were having black eyelid colour. Chavhan (2018) also recorded similar eyelid colour pattern. He observed that 186 (93.0%) cattle had black eyelid colour and remaining 14 (7.0%) cattle were having white eyelid colour in Kathani cattle in Goregoan tahsil of Gondia district.

Horn colour: The horn colours observed were black (63.28%) and brown (36.72%). The results indicated that most of the non-descript buffaloes were having black horn colour followed by the brown colour. Rahman *et al.* (2015) ^[7] noticed that horn colour was generally black in indigenous buffalo in Sylhet District. This is due to agro-climatic changes and genetic makeup of the animals.

Hooves colour: Most of the buffaloes in Konkan region had black hooves (65.06%), followed by the brown (34.94%) hooves. Similar result was reported by Taneja (2002) ^[1] in Bhadawari buffalo and Kutty and Khamer (2005) ^[2] in Murrah buffaloes. Rahman *et al.* (2015) ^[7] reported that hooves colour was mostly black (96.70%) in indigenous buffaloes in Sylhet district.

Switch of tail colour: The colour of the switch of tail in non-descript buffaloes studied in the Konkan region was black (51.29%), brown (8.59%) and white (40.12%), respectively. These results indicated that in non-descript buffaloes black coloured switch of tail was the most common. Similar observation was reported by Gubbawar (2008) ^[4] who observed that majority of the buffaloes were having white switch of tail (74.20%) whereas (32.50%) buffaloes were having black switch of tail and 3.30 percent buffaloes, it was brown in colour.

Table 1: Show No. of animals, Coat colour (%), Muzzle colour (%), Eye Colour (%) and Eyelid colour (%)

District	No. of animals	Coat colour (%)		Muzzle colour (%)			Eye Colour (%)			Eyelid colour (%)	
		Black	Brown	Black	Black	Brown	Black	Brown	White	Black	Brown
Palghar	215	57.21 (123)	42.79 (92)	79.07 (170)	85.12 (183)	14.88 (32)	79.07 (170)	18.60 (40)	2.33 (5)	85.12 (183)	14.88 (32)
Thane	205	59.02 (121)	40.98 (84)	72.48 (149)	89.76 (184)	10.24 (21)	72.48 (149)	26.82 (55)	0.48 (1)	89.76 (184)	10.24 (21)
Ratnagiri	210	58.10 (122)	41.90 (88)	77.14 (162)	89.52 (188)	10.48 (22)	77.14 (162)	21.43 (45)	1.43 (3)	89.52 (188)	10.48 (22)
Sindhudurg	220	61.36 (135)	38.64 (85)	76.82 (169)	84.55 (186)	15.45 (34)	76.82 (169)	21.82 (48)	1.36 (3)	84.55 (186)	15.45 (34)
Overall average (%)	850	58.94 (501)	41.06 (349)	76.47 (650)	87.68 (350)	12.32 (50)	76.47 (650)	22.24 (189)	1.29 (11)	87.68 (350)	12.32 (50)

Table 2: Show No. of animals, Horn colour (%), Hooves colour (%) and Switch of tail colour (%)

District	No. of animals	Horn colour (%)		Hooves colour (%)		Switch of tail colour (%)		
		Black	Brown	Black	Brown	White	Black	Brown
Palghar	215	66.04 (142)	33.95 (73)	44.19 (95)	10.70 (23)	45.12 (97)	70.23 (151)	29.77 (64)
Thane	205	60 (123)	40 (82)	59.51 (122)	5.85 (12)	34.63 (71)	59.02 (121)	40.98 (84)
Ratnagiri	210	64.76 (136)	35.23 (74)	52.38 (110)	7.14 (15)	40.48 (85)	63.81 (134)	36.19 (76)
Sindhudurg	220	62.27 (137)	37.72 (83)	49.55 (109)	10.45 (23)	40.00 (88)	66.82 (147)	33.18 (73)
Overall average (%)	850	63.28 (538)	36.72 (308)	51.29 (436)	8.59 (73)	40.12 (341)	65.06 (553)	34.94 (297)

Body orientation and shape

Horn shape: The horns were curved in backward as 24.71 percent and in 22.94 percent of cases it was curved in forward direction. Straight horns with backward curve and forward direction were noticed in 26.94 percent and 25.41 percent buffaloes, respectively. Similar to the present finding, Sastry and Thomas (2005) [8] reported straight back horns in Surti and Taneja (2002) [11] reported curved, backward, upward and usually twisted outside horns in Pandharpuri buffaloes.

Horn orientation: The orientation of horn of non-descript buffaloes in the Konkan region was sword like, sickle shape and drooping in 51.06, 44.47 and 4.47 percent animals, respectively. This indicated that non-descript buffaloes in the region had mostly sword like horn orientation. Similar findings were reported by Gubbawar (2008) [4] who observed

that long horn is considered to be the specific character of Nagpuri buffaloes. Long sword like horns carried backward along the sides of the neck reaching up to shoulder were observed in 75.80 percent buffaloes.

Ear orientation: The ear orientation observed was horizontal and drooping in 78.00 and 22.00 percent cases, respectively. The results further showed that most of the non-descript buffaloes were having horizontal ear orientation followed by drooping ear orientation. Similarly, Gubbawar (2008) [4] also observed that majority of Gaolao type of buffaloes had long horizontal ears 79.20 percent while dropping ears were present in 20.80 percent buffaloes. Similar results were also reported by Thalkar *et al.* (2016) [9] in Purnathadi strain of Nagpuri buffaloes.

Table 3: Show Horn shape (%), Horn orientation (%) and Ear orientation (%)

Horn shape (%)				Horn orientation (%)			Ear orientation (%)	
Curved		Straight		Sword like	Sickle shape	Drooping	Horizontal	Drooping
Backward	Upward	Backward	Upward					
26.51 (57)	20.00 (43)	27.91 (60)	25.58 (55)	48.84 (105)	45.12 (97)	6.05 (13)	75.81 (163)	24.19 (52)
23.90 (54)	24.88 (49)	25.85 (53)	25.37 (52)	54.15 (111)	44.47 (88)	2.93 (6)	79.51 (163)	20.49 (42)
25.71 (54)	23.33 (52)	30.00 (63)	20.95 (44)	54.29 (114)	40.00 (84)	5.71 (12)	81.43 (171)	18.57 (39)
22.73 (50)	24.88 (51)	24.09 (53)	29.55 (65)	47.27 (104)	49.55 (109)	3.18 (7)	75.51 (166)	24.55 (54)
24.71 (210)	22.94 (195)	26.94 (229)	25.41 (216)	51.06 (434)	44.47 (378)	4.47 (38)	78.00 (663)	22.00 (187)

Body characters

Forehead: The forehead shapes observed in non-descript buffaloes were straight (22.24%), concave (54.0%) and convex (23.76%). This showed that concave forehead was the most common in buffaloes. In accordance with the present findings Dar *et al.* (2018) [3] also observed that considerable number of animals (52.22%) were having straight forehead followed by convex (46.67%) and concave (1.11%) in buffaloes from Kashmir Valley.

Brisket: The results given in the table 4.11 and fig 4.17 revealed that, large, medium and small briskets were observed in non-descript buffaloes in the proportion of male and females 6.58 and 29.52, 8.47 and 28.70 and 17.47 and 8.47 percent, respectively. These results indicated that most of the non-descript female buffaloes were having medium size brisket followed by large and small size brisket. The findings are contrary with Banerjee (1998) [5] in Nagpuri buffalo, Kutty and Khamer (2005) [2] in Jaffarabadi buffalo and Sreekumar

and Sreenivasaiah (2015) [6], was nearly same in Mehsana breed of buffalo.

Sheath flap: The sheath flap of non-descript buffaloes was observed as large, medium and small sheath flap in 27.94, 56.86 and 15.19 percent, cases respectively. Taneja (2002) [11] also observed small size sheath flap in Nagpuri buffalo.

Naval flap: The naval flap of non-descript buffaloes was observed as large, medium and small naval flap in 14.24, 70.59, 15.17 percent, buffaloes respectively. Dar *et al.* (2018) [3] observed that the naval flap was absent in maximum proportion in most of the buffaloes (82.22%) whereas naval flap was small and large in 17.41 percent and 0.37 percent, cases respectively in buffaloes from Kashmir valley.

Udder size: The large, medium and small sized udders were observed in 17.64, 66.25 and 16.09 percent buffaloes, respectively. The findings are closely related with that observed by Dar *et al.* (2018) [3]. They found the size of udder

in three types viz. large, medium and small in 1.87, 22.89 and 75.24 percent of buffaloes in two districts of south and north Kashmir valley.

Udder shape: The udder shape observed was bowl, pendulous and rounded in non-descript buffalo and it was in the proportion of 32.81, 18.57 and 48.60 percent in the respective order. The results indicated that most of the non-descript buffaloes were having rounded shape udder followed by bowl and pendulous udder. Gubbawar (2008)^[4] observed that Gaolao type of buffalo possessed mostly bowl-shaped udder (53.40%) whereas (38.60%) and (18.00%) showed round shaped udder and goat type of udder, respectively.

Teat shape: The teat shape observed was cylindrical and funnel in 58.20 and 41.80 percent buffaloes, respectively. In

accordance with the present result, Dar *et al.* (2018)^[3] also observed that cylindrical shape (85.04%) and pear shape (14.96%) off teats in buffaloes reared in Kashmir Valley.

Teat tip: The teat tip of the non-descript buffaloes was observed as rounded, pointed and flat in 37.15, 56.97 and 5.88 percent, cases respectively. The results were similar to that of Dar *et al.* (2018)^[3] who recorded 65.88 percent pointed and 34.12 percent rounded teat tip in buffaloes from Kashmir Valley.

Milk vein: The prominent milk vein was observed in 89.16 percent of non-descript buffaloes, whereas, it was remarkable in 10.84 percent cases. The present results are in accordance with Taneja (2002)^[1] in Kundi buffalo and Kutty and Khamer (2005)^[2] in Surti, Nilli-ravi and Mehsana breeds of buffalo.

Table 4: Show No. of animals, Forehead (%) and Brisket (%)

District	No. of animals	Forehead (%)			Brisket (%)					
		Straight	Convex	Concave	Large		Medium		Small	
					Male	Female	Male	Female	Male	Female
Palghar	215	24.65 (53)	51.16 (110)	24.19 (52)	6.97 (15)	31.62 (68)	6.045 (13)	28.37 (61)	18.60 (40)	8.37 (18)
Thane	220	20.00 (41)	55.12 (113)	24.88 (51)	6.81 (15)	26.36 (58)	9.09 (20)	28.63 (63)	14.54 (32)	7.72 (17)
Ratnagiri	205	25.71 (54)	51.43 (108)	22.86 (48)	6.82 (14)	28.78 (59)	10.24 (21)	31.70 (65)	16.09 (33)	8.78 (18)
Sindhudurg	210	18.64 (41)	58.18 (128)	23.18 (51)	5.71 (12)	31.42 (66)	8.57 (18)	26.19 (55)	20.47 (43)	9.04 (19)
Overall average (%)	850	22.24 (189)	54.00 (459)	23.76 (202)	6.58 (56)	29.52 (251)	8.47 (72)	28.70 (244)	17.47 (148)	8.47 (72)

Table 5: Show No. of animals, Udder size (%) and Udder shape (%)

District	No. of animals	Udder size (%)			Udder shape (%)		
		Large (%)	Medium (%)	Small (%)	Bowl (%)	Pendulous (%)	Rounded (%)
Palghar	160	15 (24)	68.12 (109)	16.87 (27)	30 (48)	16.25 (26)	53.75 (86)
Thane	158	20.88 (33)	65.18 (103)	13.92 (22)	35.44 (56)	19.63 (31)	44.93 (71)
Ratnagiri	163	15.75 (31)	66.25 (108)	14.72 (24)	33.12 (54)	18.78 (32)	47.23 (77)
Sindhudurg	165	17.64 (26)	65.45 (108)	18.78 (31)	32.72 (54)	18.57 (31)	48.48 (80)
Overall average (%)	646	17.64 (114)	66.25 (428)	16.09 (104)	32.81 (212)	18.57 (120)	48.60 (314)

Table 6: Show No. of animals, Teat shape (%), Teat tip (%) and Milk vein (%)

District	No. of animals	Teat shape (%)		Teat tip (%)			Milk vein (%)	
		Cylindrical	Funnel	Rounded	Pointed	Flat	Prominent	Not-prominent
Palghar	160	60.00 (96)	40.00 (64)	39.38 (63)	55.63 (89)	5.00 (8)	90.00 (144)	10.00 (16)
Thane	158	58.23 (92)	41.77 (66)	36.71 (58)	58.86 (93)	4.43 (7)	88.61 (140)	11.39 (18)
Ratnagiri	163	58.28 (95)	41.72 (68)	36.20 (59)	60.74 (99)	3.07 (5)	88.34 (144)	11.66 (19)
Sindhudurg	165	56.36 (93)	43.64 (72)	36.36 (60)	82.73 (87)	10.91 (18)	89.70 (148)	10.30 (17)
Overall average (%)	646	58.20 (376)	41.80 (270)	37.15 (240)	56.97 (368)	5.88 (38)	89.16 (576)	10.84 (70)

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