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Characterisation and evaluation of Tho-Tho cattle of Nagaland

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ABSTRACT

Surveys were conducted in 24 villages of 4 districts of Nagaland, i.e. Kohima, Phek, Zuhneboto and Dimapur to characterise Tho-Tho cattle of Nagaland. A total of 242 cattle of different age and sex including 186 Tho-Tho and 56 desi/non-descript were recorded for physical and ten different morphometric traits. To know management and performance of Tho-Tho cattle, 76 farmers were interviewed form these districts. It was observed that Tho-Tho cattle was mainly reared for beef as people preferred beef over pork. Cattle population of the state showed sharp decline of 51% during the years 2007–2012 and needs immediate attention. Based on different physical and morphometric traits, it may be concluded Tho-Tho cattle are distinct as compared to indigenous cattle of Tripura, Mizoram, Manipur and Siri of Sikkim. Tho-Tho cattle were larger in size as compared of desi/non descript cattle of the state. Management and performance was more or less similar in the whole north-east region i.e extensive system of management. Multi-variate canonical discriminate analysis using different morphometric traits of indigenous cattle of Manipur, Meghalaya, Mizoram, Nagaland, Sikkim (Siri) and Tripura showed that Siri (Sikkim) and Tho-Tho (Nagaland) were significantly different than other indigenous cattle of the region and it was supported by physical traits also. Therefore, it is recommended that Tho-Tho cattle population may be registered as distinct cattle breed from Nagaland.

Key words: Characterization, Indigenous cattle, Morphometric traits, Performance, Physical traits, Tho-Tho cattle

Nagaland is a mountainarian and predominantly an agricultural state located in north-east part of the country.The geographical area of the state is 16579 km^2 (0.5% of the country). The state had 0.91 million livestock population including cattle (25.79%), buffalo (3.59%), Goat (10.9%), pig (55.28%), mithun (3.83%) and others (0.61%, i.e. sheep and equines etc.). In the state, 87.7% population belongs to tribal. Around 73% of the people in Nagaland are engaged in agriculture. Literacy rate in the state was 79.55%. The climate of Nagaland is hot to warm sub-tropical. The annual rainfall in the state ranged from 1400 mm to 1800 mm. The soils available in the state are alluvial and laterite soils. Rice is the staple food. During the year 2015–16, state produced 77,000 tonnes of milk and indigenous/non-descript cattle contributed 12,700 tonnes of milk (16.49%). The per capita availability of milk in the state was low (89 ml per day). Productivity in terms of milk yield per day per milk of indigenous cattle was 1.83 kg and for crossbreds 5.5 kg, both were lower than the national average. In Nagaland, total meat production in the year 2015–16 was 35,930 tonnes and indigenous/non-descript cattle contribution was 32% (Anonymous 2016).

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It was observed that there was good number of indigenous cattle and among them one is called Tho-Tho and rest still known as non-descript/desi. There is not a single registered cattle breed from the state and all are known as *desi* cattle. There was no information available on indigenous cattle of Nagaland in the literature. In the present study, an attempt was made to characterise the Tho-Tho cattle population and if found suitable then register as a distinct breed so that the genetic improvement programmes may be planned to improve the productivity as they are contributing significantly to the livelihood in the state,.

MATERIALS AND METHODS

Surveys were conducted in 4 districts of the Nagaland including 24 villages from Kohima district (Khuzama, Viswema, Kidima, Kigwema, Phesama, Khuzee and Sanuorii), Phek district (Leshemi, Phusachodu and Zapami), Zuhneboto district (Mukalimi and Hebolmi villages of Ghathashe block, Sgoixe and Kiyekhu villages of Satakha block, Vezmi village of Zuhneboto block, Naghuto New and Naghoto Old villages of Atoizo block) and Dimapur district (Singrijam, Diezephe, Urra and Kiyeto villages of Dhansiprra block and Hoito, Kuhvboto and New Sgowba villages of Kuhvboto block of Dimapur). A total of 76 farmers were interviewed and 242 cattle of different age and sex (186 Tho-Tho and 56 desi/non-descript) were recorded for physical, ten different morphometric traits and performance.

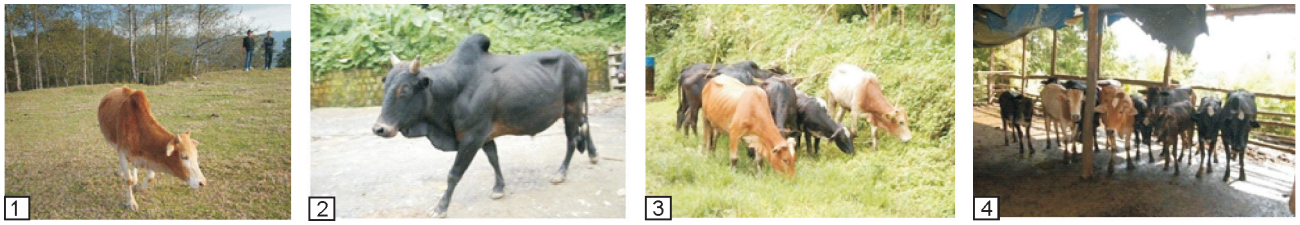
Information on various management practices opted by the livestock owners in the state were recorded through interviews of the farmers on a predesigned questionnaire. The body measurements included body length, height at withers, chest girth, paunch girth, horn length, ear length, face length, face width, tail length without switch and with switch. The body measurements data were analysed by least square maximum likelihood program (Harvey 1990) separately for both the groups (Tho-Tho and desi) incorporating age within sex as fixed effects. Farmers were interviewed to know the habitat, status, management, utility and performance of the cattle available. Farmers were also enquired about choice of breed, sale and purchase of animals, animal housing, feeding, breeding and prevalent diseases in the area. Performance traits like body weight at birth, age at first calving, daily milk yield, lactation length, dry period, service period, calving interval and draught performance were collected by conversing with the farmers from the surveyed villages using structured questionnaire. The survey included 102 males (67 Tho-Tho and 35 desi) and 140 females (119 Tho-Tho and 21 desi) animals. Age wise distribution of Tho-Tho cattle were bullocks (44), cows (77), 3 to 6 months (5), 6 to 12 months (17) and 1–3 years (43).

RESULTS AND DISCUSSION

It was observed that in Kohima and Phek districts, majority of cattle (90%) were Tho-Tho and rest known as non-descript. In Zuhneboto district, around (60%) cattle were Tho-Tho and rest were non-descript. In Dimapur district, majority (95%) of the cattle population were non-descript. Only 5% cattle were Tho-Tho. In the state there were 2,34,970 cattle heads comprising 1,28,950 crossbreds and 1,06,020 indigenous in the year 2012 (Livestock Census 2012). During the years 2003 to 2007, indigenous and crossbreds cattle increased by 3.36% and 4.11%, respectively while total cattle population increased by 3.99%. The population trends during the years 2007 to 2012 showed a sharp decline in indigenous as well as crossbreds cattle populations by 50.88% and 49.23%, respectively. During the same period, total cattle population also showed decline of around 51%. District wise cattle population showed that Dimapur district had maximum number of cattle population (24.48%) in the state followed by Tuensang (11.9%) and Zuhneboto (11.61%) districts. Major crops grown in the state were rice, maize, linseed, potato, pulses, soyabean, jute, gram, cotton and castor. In the state, there were two main agricultural systems observed, i.e. shifting cultivation (73% total area) and TRC/WRC and jhum. Farmers were taking only one crop in a year. Land holding pattern showed that there were 9.73% large farmers, 70.12% medium, 13.91% small and 6.24% marginal.

Management practices: Feeding, cleaning and milking were done by men and women both. Tho-Tho cattle were reared for beef only in the state. People of the state favoured beef over pork and Tho-Tho cattle over the indigenous for this purpose. However, in Dimapur district, majority of the farmers reared desi catle for milk and agricultural work. Cattle were reared on extensive system of management, i.e. only on grazing from 8.00 AM to 5.00 PM. at free range from August to March. During *kharif* season, fields were occupied by paddy and controlled grazing practiced. Very few farmers provided small amount of fodders at home during night (5%), else reared only by grazing. Chaffing of fodder was not observed. In Dimapur district, some farmers (42%) provided supplement feeding mainly local grasses.Tieing of animals was observed in night only in some of the cases. In some cases (Phek district), animals were kept in Jungle using wire fencing of an area. Animal houses were made off with tin roof and wood stick. There was no wall or half wall. Animal houses were separated from the residence of farmers (84%). Drainage system of the animal houses was inadequate. Floor of the animal houses were *kachha* in all the cases. Dehorning and de-worming practices were not adopted. Castration was there at the age of 6 months. Milking was once in a day, i.e. morning in Dimapur district. Semen of indigenous cattle was not available in veterinary hospitals in the area. Therefore, breeding was through natural mating and bulls were available in the cattle herds. Vaccinations for prevention of HS, FMD and BQ were observed (74%). Herd size ranged from 5–30. Every product from cattle consumed at home except horns. Horns were used as ornamental peace at homes.

Physical traits: Tho-Tho cattle are medium in size, hardy, well-built and docile. The body colour, black predominates (82%) followed by brown (16%) and grey (2%). Around 40% animals had white spot on the face. Some of the animals had white spots on legs and under body too. Skin was black. Muzzle was black (88%) and brown. Muzzle was black (86%) and brown. Hump and dewlap were moderate in cows and large in bulls. Bulls were darker in colour. Fore-head was small and straight. Ears were moderate in length and horizontal in orientation. Horns were smaller in length (9–12 cm), stumpy or outward, foreword and then upward in orientation. The backline was uneven, slopes behind the small hump, rises to peak between hip bones and then drops



Figs 1–4. **1.** Cow; **2.** Bull; **3.** Tho-Tho cattle in grazing; **4.** Housing system

Table 1. Different morphometric traits of Tho-Tho and desi cattle of Nagaland

Age and sex	Type	No	Body length	Height at wither	Chest girth	Paunch girth	Horn length	Ear length	Face length	Face width	Tail length without switch	Tail length with switch
Male 3–6 Mo	Tho-Tho	2	78.50±5.50	84.50±9.50	98.50±19.50	98.00±17.00		19.00±3.00	28.00±5.00		53.00±2.00	53.00±2.00
Female 3–6 Mo	Tho-Tho	3	65.00±6.80	77.66±0.88	83.33±2.96	83.33±3.71		15.00±0.57	22.33±0.88		43.33±1.33	43.33±1.33
Male 6–12 Mo	Tho-Tho	6	74.00±2.01	86.16±3.94	105.16±6.53	105.83±6.98		15.66±1.14	29.00±1.86		52.50±1.72	55.83±2.32
	Desi	2	70.50±19.50	87.50±12.50	113.50±18.50	110.50±16.50		16.50±1.50	35.50±6.50	23.50±3.50	51.00±7.00	66.50±6.50
Female 6–12 Mo	Tho-Tho	11	80.36±2.86	91.00±2.20	109.36±4.70	113.18±4.42		17.45±0.54	30.54±1.14		60.27±2.32	63.90±3.70
Male 1–3 Yrs	Tho-Tho	15	85.26±4.23	91.93±3.00	117.66±4.77	122.20±4.41	6.86±0.90	17.80±0.71	35.13±1.24	23.33±0.78	56.40±3.48	63.53±3.13
	Desi	5	80.00±2.30	91.00±4.09	115.00±4.87	120.20±5.27	8.00±3.09	17.80±1.15	34.80±1.93	27.00±0.83	56.00±0.83	74.60±1.40
Female 1–3 Yrs	Tho-Tho	28	88.07±2.39	95.46±2.06	120.82±3.37	121.82±3.39	6.71±0.66	18.10±0.44	33.39±0.67	21.80±0.66	63.42±2.40	66.53±2.08
	Desi	7	79.14±2.08	86.00±2.67	112.42±5.20	117.42±7.06	7.28±1.28	17.00±0.57	32.85±0.98	25.57±0.52	55.00±5.58	74.42±4.67
Bullocks	Tho-Tho	44	103.93±1.28^a	107.59±1.02^a	148.02±2.28^a	148.63±1.84	11.00±0.98	19.97±0.32	39.95±0.40	23.53±1.07^a	74.22±1.17	86.31±1.30^a
	Desi	28	96.92±1.99^b	102.46±1.42^b	135.57±3243^b	144.92±2.33	12.64±1.74	19.25±0.34	40.67±0.79	30.14±0.61^b	71.14±2.16	93.96±1.56^b
Cows	Tho-Tho	77	103.14±1.03^a	106.23±0.68^a	142.45±1.40^a	144.01±1.42^a	9.90±0.46	20.15±0.25^a	38.31±0.31	25.88±0.45	73.86±1.11^a	84.46±1.47
	Desi	14	92.28±2.83^b	95.85±2.38^b	128.92±3.71^b	134.21±6.56^b	8.28±1.12	18.50±0.60^b	37.35±1.38	26.71±1.08	68.92±2.90^b	86.21±4.09

sharply to the tail head. Udder was small not developed. Tail was up to the hock with black (81%) and brown switch. In non-descript cattle, brown colour predominates. As compared to indigenous cattle of Tripura, Manipur and Mizoram, they look completely distinct and can be differentiated easily based on physical traits. The typical cow, bull, housing pattern and grazing of Tho-Tho cattle are shown in Figs. 1-4, respectively.

Morphometric traits: Different morphometric traits of Tho-Tho cattle and desi cattle are presented in Table 1. The ten different body measurements were recorded on 242 animals of different age and sex including Tho-Tho and desi (non-descript). Both the groups (Tho-Tho and desi data) were analysed separately according to age and sex effects. The average body length, height at wither, chest girth, paunch girth, horn length, ear length, face length, face width, tail length without switch and with switch in Tho-Tho cows (77) were 103.14±1.03 cm, 106.23±0.680 cm, 142.45±1.40 cm, 144.01±1.42 cm, 9.90±0.46 cm, 20.15±0.25 cm, 38.31±0.31 cm, 25.88±0.45 cm, 73.86±1.11 cm and 84.46±1.47 cm, respectively. The corresponding estimates in bullocks (44) were 103.93±1.28 cm, 107.59±1.02 cm, 148.02±2.28 cm, 148.63±1.84 cm, 11.00±0.98 cm, 19.97±0.32 cm, 39.95±0.40 cm, 23.53±1.07 cm, 74.22±1.17 cm and 86.31±1.30 cm, respectively. All the estimates did not differ significantly in cows and bullocks of Tho-Tho cattle. However, cows of Tho-Tho and desi differed significantly in body length, height at wither, chest girth, paunch girth, ear length and tail length without switch, all the estimates were higher in Tho-Tho cattle as compared to desi cows. Similarly, bullocks of Tho-Tho and desi cattle also differed significantly in body length, height at wither, chest girth, face width and tail length without switch and all these estimates were higher in Tho-Tho bullocks. Body length estimates obtained in Tho-Tho cows were in close agreement with the reports of indigenous cattle of Manipur (Pundir *et al*. 2015b), Siri cattle (Pundir *et al*. 2016) and higher than the reports of Pundir *et al*. (2014) in indigenous cattle of Tripura and Uttarakhand (Pundir *et al*. 2013). Estimates of height at wither were lower than the reports of Pundir *et al*. (2016) and similar to the reports of Pundir *et al*. (2015a &b). The estimates of chest girth and paunch girth were higher than the reports of Pundir *et al*. (2014) and in close agreement with the reports of Pundir *et al*. (2015 a&b) and lower than the Siri cattle (Pundir *et al*. 2016). Estimates of ear length, face length and face width were similar to the indigenous cattle of Tripura (Pundir *et al*. 2014), Mizoram (Pundir *et al*. 2015a), Manipur (Pundir *et al*. 2015b) and Siri cattle (Pundir *et al*.2016). Tail length without switch were similar to the reports of indigenous cattle of Manipur (Pundir *et al*. 2015b) and Siri cattle (Pundir *et al*. 2016) and higher than the indigenous cattle of Tripura (Pundir *et al*. 2014). Multi-variate canonical discriminate analysis on different morphometric traits of cattle of Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura showed that Siri (Sikkim) and Tho-Tho (Nagaland) were significantly different than other

indigenous cattle of the region (Pundir 2017) and supported by physical traits also.

Performance: The birth weight ranged from 12 to 18 kg. Adult body weight ranged from 300 to 400 kg in males and 250 to 350 kg in female. In Tho-Tho cows, there was no milking observed. However, in Dimapur district, in desi cows milking was there once in a day, i.e. morning. The daily milk yield ranged from 2.0 to 4.0 kg. The average daily milk yield obtained in the study was higher than the Tripura cows (Pundir *et al.* 2014) and cows of Kumaun region of Uttarakhand (Pundir *et al.* 2013). The average daily milk yield was lower than the Malnad Gidda cattle (Singh *et al.* 2008). The age at first calving, lactation length, dry period, service period and calving interval ranged from 40 to 60 months, 100–150 days, 240–300 days, 120 to 180 days, 400 to 550 days, respectively. The estimates of age at first calving were within the range as reported by Singh *et al*. (2004) and Pundir *et al.* (2015b) in Manipur cattle. Similar estimates of age at first calving and calving interval but lower dry period and service period were observed in Malnad Gidda cattle by Singh *et al.* (2008) as compared to the present study. A pair of bullock may plough about 0.5 acre of land in 6–8 h. The bullock performance was lower than the hill cattle of Uttarakhand (Pundir *et al.* 2013).

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