

Characteristics of Motu cattle, a draft cattle breed of Odisha, India

S.R. Dash^{1*}, H.K. Sahoo², P.K. Padhy¹ and B.R. Pattanaik¹

¹*Krishi Vigyan Kendra, Malkangiri, ²Directorate of Extension Education, OUAT, Bhubaneswar, Odisha
*Corresponding author, email: samirdash2007@rediffmail.com

Journal of Livestock Science (ISSN online 2277-6214) 13:120-126
Received on 29/1/22; Accepted on 7/4/2022; Published on 18/4/22
doi. 10.33259/JLivestSci.2022.120-126

Abstract

India, third richest biodiversity country in the Asia and it is home to huge indigenous cattle genetic resources. The indigenous livestock population possesses valuable traits such as disease resistance, high fertility, good maternal quality, longevity and possess unique ability to utilize poor quality feed, and can adapt to harsh and difficult climate. Assessment of diversity is essential for germplasm characterization and management. Motu, the dwarf cattle breed is used for draught purpose in hilly and undulated terrain and the breed is named after local area "Motu" of Malkangiri district in Odisha. Their breeding tract comprises southern part of Malkangiri district and adjoining area of Chhattisgarh and Andhra Pradesh. Heavy concentration of these animals is found in Motu, Kalimela, Podia and Malkangiri areas of Malkangiri district. The coat colour of this breed is mainly brown (reddish) and sometimes gray. Animals of this breed are mostly polled and horns whenever present emerge straight and upward and end with rounded tip. Though the breed is small sized they are strong in built. The milk yield is meager and ranges from 60 to 140 Kg in a lactation with 4.8 to 5.3% fat. These local breeds are specially adapted to different agro-climatic conditions and their genetic diversity is due to the process of domestication over the centuries. The native breeds like Motu need to be conserved for genetic insurance in future, scientific study, as a part of our ecosystem, cultural and ethical requirements and for energy sources in future. Genetically improvement and enhancement of the breed up gradation and improvement for this cattle breed along with its maintenance and conservation of this indigenous breed is highly needed.

Key words: Genetic diversity; Indigenous cattle breeds; Conservation of local breed; Motu cattle; Odisha

Introduction

India has a rich heritage of rearing cattle where farmers selected native cattle suitable to their local agro-ecological conditions for centuries. India is the seventh largest country in the world and is a mega-biodiversity centre (Srivastava et al. 2019). India, third richest biodiversity countries in the Asia and it is home to huge indigenous cattle genetic resources. It is reflected in 50 indigenous breeds of cattle, besides many lesser known populations not explored so far. It is the need of the hour to characterize such populations to have prudent improvement and conservation options (Sharma et al. 2020). Cattle are the most important livestock in India and play a pivotal role in agrarian economy. Over 70 per cent of its people are engaged in vocations connected with farming and animal husbandry. In India, total livestock population is 512.5 million and among that 192.49 million are cattle, which is cover 37.28 percent of total livestock. India emerges out to be the cattle king with a cattle population of 192.49 million as reported in 20th Livestock Census 2019. In addition to this large number of non-descript cattle population available throughout country. These indigenous cattle breeds are especially more adapted to different agro-climatic conditions of India and some of indigenous cattle breeds were performing excellent in other country throughout world. Indian subcontinent is a rich source of diverse germplasm and only very few countries have such a large number of breeds with wide genetic diversity. India, therefore, initiated activities aimed at determining the status and compiling information on indigenous farm animals. Apart from this indigenous cattle breeds have many merits like better disease resistance, low input management and better survival in extreme weather condition, this make them imperative in current climate change situation. In recent times, several of the indigenous breeds suffered decline mainly due to their becoming uneconomical. Phenotypic characterization is vital for managing the animal genetic resources at nationwide and regional levels. Huge proportion of nondescript cattle characterization and inventorization of cattle genetic resources of India is still incomplete. Animal genetic resources represent an important component of global biodiversity in terms of food security and sustainability. In developing countries, they play an important role in the subsistence of many communities and sustainability of crop livestock system. It is estimated that domestic animal genetic resources contribute 30% of total human requirements for food and agriculture, either directly or indirectly as reported by (Das and Das ,2016). Diversified agro-ecological zones in India have helped to develop number of cattle populations. Breed characterization allows to study assessment of genetic variability, a fundamental element in working out breeding strategies and genetic conservation plans. In recent times, several of the indigenous breeds suffered decline mainly due to their becoming uneconomical. India has large number of breeds with wide genetic diversity than other countries. The local breeds have many merits over exotic breeds viz. better disease resistance than exotic breeds, more suitable for low input management system, Survive better in local environmental condition, suitable for draught work. In addition, existence of superior indigenous breeds can provide valuable research inputs for developing superior breeds. It is therefore important that Indigenous breeds of cattle are to be conserved, developed and proliferated. Breed registration and recognition is a very important step for breed certification and all relevant information regarding the enormous and bio-diversed animal genetic resources of our country ,the procedure shall lead to formation of breed inventory and try identify and understand these unique genetic resources which shall ultimately facilitate the genetic improvement of the native livestock population (Savalia et al. 2019).

Management of our native germplasm has become a major challenge as most of our breeds are low producers. These populations are facing genetic dilution due to multiple factors like increasing mechanization in agriculture, over emphasis on some high producing breeds, market forces and many unforeseen factors in different parts of the country. Thus, there is a need to develop a strategy for conservation and sustainable utilization of indigenous cattle breeds by utilizing available technologies for their management (Raja et al. 2020). National Bureau of Animal Genetic Resources (NBAGR) at Karnal by Indian Council of Agricultural Research (ICAR), is main functioning on identification, evaluation, characterization, conservation and sustainable Utilization of Livestock Genetic Resources. The majority of the indigenous breeds of various species have been characterized phenotypically as well as genetically with efforts from NBAGR phenotypic characterization of domestic animal diversity of India, accelerated. A large number of recognized livestock and poultry breeds and populations were systematically studied and documented recently. Currently India has 50 registered breeds of cattle and Motu breed has been registered by NBAGR as a draft cattle breed of Odisha (www.nbagr.res.in) (Accession No. INDIA-CATTLE—1526-MOTU-03031). The main categories under cattle population are Exotic/ Crossbred and Indigenous/Non-descript. There is decrease of 4.10% in cattle population and 3.14% in cattle genetic resources of India as compared to the quinquennial livestock census (19th Livestock Census 2012). The exotic/ crossbred population has been increased by 20.18% during the period of last census while population of indigenous cattle has been decreased by 8.94% during the same duration (www.nbagr.res.in). The reasons for depletion of native breeds includes crossbreeding with exotic breeds, economically less viable, loosing utility, reduction in herd size and the largescale mechanization of agricultural operation. Characterization and registration are primarily required to prevent loss of unique gene pool and to preserve maximum amount of genetic diversity. Evaluation of genetic variability emerges out as a fundamental element in working out breeding strategies and genetic conservation plans (Sharma et al. 2006).

Odisha with its varied culture base inherited from ancient times is endowed with large rivers and dense forest that have helped development of various livestock and poultry species with wide diversity. Its rich animal genetic resource base has been further strengthened by import of various animals by the maritime community of the ancient Kalinga Empire. Besides, various tribal ethnic groups have traditionally preserved varieties of crop as well as livestock population over thousands of years. Recent import of exotic and improved animal breeds by missionaries and government agencies has further strengthened the livestock resources in Odisha. Livestock production has been an integral part of rural livelihood system in Odisha all through the known history of the state. The predominant farming system in the State is the mixed crop livestock farming system and over 90 % of all farms of all categories conform to this farming system. The livestock wealth in Odisha is equitably distributed in all sections of the society and constitutes a natural resource base with immense livelihood implication (Das et al. 2005). Around 80% of marginal or small as well as landless farmers in the State of Odisha possess livestock of some species or the other. However, cattle head the preference list. Crop production in Orissa is almost dependent on work animals such as bullocks for farm power and the primary objective of the farming community in the breeding of cattle, consequently, continues to be the production of work animals (Dash et al. 2013). The percentage of landless, sub marginal and marginal farmers accounts for more than 50% of rural population in the state. The genetic characterization would lead to identification of unique gene pools which can be prioritized for conservation of local breeds (Gandhi and Sharma, 2016). The genes/alleles responsible for desirable traits would provide added value to our Animal Genetic Resources. Desi Cows are the domestic cows found in the Indian subcontinent. These cows have been a source for milk, cow urine and cow dung in the Indian lifestyle since ages. The presence of Desi cows is considered holy as well as medicinal in the Indian culture. Draught breeds utility has decreased because of rapid mechanization in agriculture. Indigenous livestock are bestowed with many unique characteristics. adaptations of indigenous cattle in relation to their ability to tolerate heat and parasites as well as their ability to survive and produce milk and capacity to work in harsh conditions under poor quality feed and fodder is yet to be fully understood, and exploited for further breed improvements.

The local cow breeds are uniquely adapted to India's many agro-climatic environments, and its genetic variety is a result of centuries of domestication, hence determining diversity is critical for germplasm characterization and management. Native cattle breeds like Motu must be preserved for future genetic insurance, scientific research, as part of our ecosystem, cultural and ethical obligations, and as future energy sources. All forms of breed up gradation and genetically improved cow breeds are essential for the maintenance and conservation of this indigenous breed.

Materials and methods

The study was carried out in four villages by Krishi Vigyan Kendra (KVK), Malkangiri during Kharif season in the year 2020. The study was under taken in villages Udrugunda and Koimetla of Kalimela block and MPV - 56 and Durumaguda of Podia block and these blocks were selected purposefully as the local breed Motu was the predominant cattle breed located in this area. A total number of 60 animals were selected by random sampling method from these four villages, fifteen animals from each village and their unique characteristics were identified and documented after discussing with the farmers of this area. Some secondary information was also collected and the information and characteristics collected from field level was triangulated and final inference documented.

Result and discussion

The information and characteristics collected from field level was documented as below under different sub head.

Breed description

The native tract of this breed is Motu area of Podia block of Malkangiri district. The animals are mostly reared by 'KOYA' tribes of the district. This dwarf cattle breed is used for draught purpose in hilly and undulated terrain and the breed is named after local area "Motu" of Malkangiri district in Orissa. Their breeding tract comprises southern part of Malkangiri district and adjoining area of Chhattisgarh and Andhra Pradesh. Heavy concentration of animals is found in Motu, Kalimela, Podia and Malkangiri areas of Malkangiri district in Orissa. Sandy and clay type soil is predominant in this area. Coat colour of this breed is mainly brown (reddish) and sometimes gray with few animals are found white in colour. Animals of this breed are mostly polled and horns whenever present emerge straight and upward and end with rounded tip. Though the breed is small sized they are strong in built. The milk yield is meager and ranges from 60 to 140 Kg in a lactation with 4.8 to 5.3% fat. Animals are mostly polled and brown in colour. And Cow dung is considered as important product from rearing of these cattle among the Koya tribes.

Authorized growers

Motu cattle are found in Southern part of Malkangiri district and adjoining area extended to Kanta block of Dantewada (Chhattisgarh) and border areas of Andhra Pradesh. These cattle are mostly reared by Koya tribe for ploughing and carting in Malkangiri district. The Koyas are an important tribe among the 62 tribes of Odisha (Patra 2016). This tribe is rich in primitive customs, tradition, art and culture. Except Malkangiri of Odisha they are also found mainly in Andhra Pradesh and Chhattisgarh. However, their concentration is more in Malkangiri than in Andhra Pradesh or Chhattisgarh. They inhabit at places like Podia, Kalimela, Mathili, Korukanda in the district of Malkangiri.

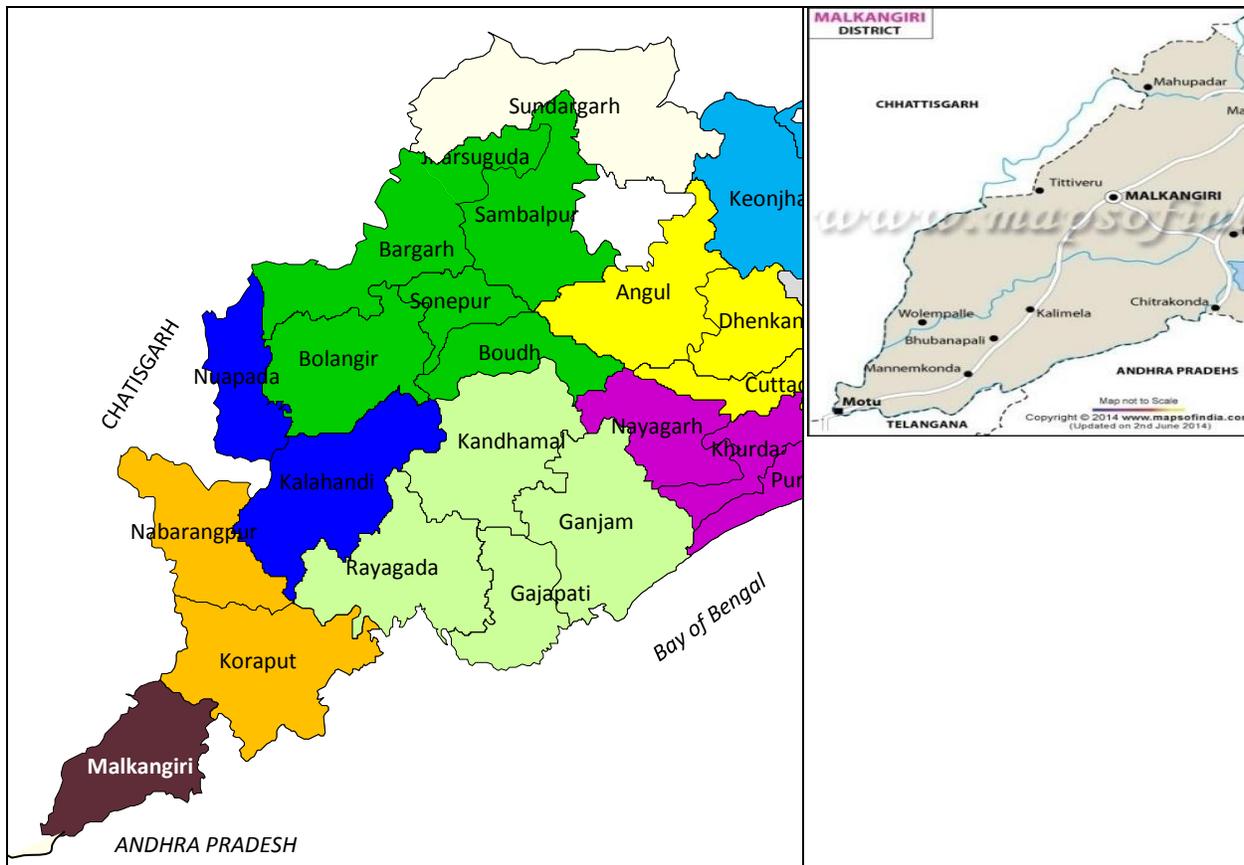


Fig 1. Odisha Map showing the Motu area, the native tract of this breed

Breeding Tract

Southern part of Malakngiri is considered as breeding tract and heavy concentration of this cattle breed is found in Motu, Kalimela, Podia area of Malkangiri district. Similar findings have been reported by (Savalia et al. 2019). These dwarf cattle are used for draught purpose in hilly and undulated terrain and the breed is named after local area. The Koya tribals of Orissa are responsible for developing and conserving the Motu breed that also goes by the name ‘Deshi’ (Das et al.2016; Dash and Sethi, 2007). Due to the existential threats on account of cross-breeding and adoption of foreign varieties, the Odissa State Government has undertaken the task of identifying and conserving the local species, especially the Motu breed. Though the breed is small in size, these strongly built cattle are used for

draught purpose in hilly and undulated terrains. The breed has excellent drought and heat tolerance and its utility areas are draught, milk and manure. Though the breed is small sized they are strong in built. Motu breed population is 7,02,347 lakhs in the Malkangiri district as per 20th Livestock Census. 2019.

Characteristics of Motu cattle

Following characteristics of this Motu breed were documented during the survey period. The animals are small-sized, strong and hardy draft type cattle having a small compact body, short legs and good posture. Males are short and strong.

- About 60% of Motu animals are polled. Horns are black in colour, strong and straight with a broad base and rounded tip.
- Coat Color mostly brown. White and grey are also seen in Motu cattle breeds.
- The forehead is flat and proportionate to the body size.
- Ears are small and parallel to the ground in Motu breeds.
- The udder is small. Milk vein is less prominent.
- The tail is long which extends below the hock.
- These animals attain maturity at the age of around 40-42 months.
- Better disease resistance than exotic breeds.
- More suitable for low input management.
- Survive better in local environment and suitable for drought work.
- Though the breed is small sized they are strong in built. The milk yield is meagre.

The animals are small sized, strong and hardy draft type cattle having small compact body, short legs and good posture. Males are short and strong. Horns are black in color, strong and straight with broad base and rounded tip. Forehead is flat and proportionate to the body size. Ears are small and parallel to the ground. Morphology Colour Mainly Brown (Reddish) sometimes found Gray colour.

It was evident from the study that the milk yield of motu breed per lactation (kg) was 60-140.0 and Fat (%) was 4.8 -5.3 The findings are in corroborated with the findings of (Pundir et al. 2013) and (Panda and Mishra, 1990). Similar findings had been reported by (Dash and Sethi, 2013).

Table 1: Characteristics of Motu Breed of Malkangiri (n=60)

Characteristics of Motu Breed	Male	Female
Height (Avg cm)	102.4	97.5
Body Length (Avg cm)	106.7	102.6
Heart Girth (Avg cm)	125.3	115.3
Weight (Avg Kg)	170.4	136.4
Birth Weight (Avg Kg)	12.4	11.5

Table -2 Performance of Cattle breed Motu (n=60)

Parameter	Average	Minimum	Maximum
Age at first Parturition (Months)	52.4	0	0
Parturition Interval (Months)	13.87	0	0
Milk yield per lactation (kg)	0	60	140
Milk Fat (%)	0	4.8	5.3

Reasons to conserve the Motu breed

The role of indigenous cattle in income generation of the rural population in general and unorganized livestock farmers in particular has been appreciated by policy makers and efforts are in progress for their characterization and improvement in Africa (Ngono Ema et al, 2014), black- motley breed in Russia (Kokaeva et al 2020), Taleshi cows in Iran (Karami et al 2018) and various indigenous breeds in India (Sharma and Singh, 2020; Dey, 2017; Patel et al 2016).

Desi cows are the native domestic cows of the Indian Subcontinent. The indigenous livestock population possess valuable traits such as disease resistance, high fertility, good maternal quality, longevity and possess unique ability to utilize poor quality feed, and can adapt to harsh and difficult climate. A few distinctive features that these cows have are: hump on their back and a large dewlap. These cows are very suitable to the weather conditions of the tropical and hot Indian terrain. The A2 protein which is a very essential protein for the human body is present in the milk of desi cows (Sodhi et al. 2012) and (Jianqin et al. 2015). The urine and dung of desi cows are known to have many medicinal properties that are used in ayurvedic medical treatments. The genetic characterization would lead to identification of unique gene pools which can be prioritized for conservation. The genes/alleles responsible for desirable traits would provide added value to our Animal Genetic Resources.

Strategy to be taken up to conserve this local breed

Conservation of domestic cattle breeds of cattle is essential due to their potentiality for production or draught capability or high resistance to diseases and heat tolerance ability. Conservation and improvement of threatened indigenous identified cattle breeds of the state should taken up by all the stake holders. Increase awareness level of the value of local breeds and their significance as a reservoir for certain genetic traits should be taken up. Emphasis should be given on improving the competitiveness of local breeds by means of selective breeding rather than cross breeding as reported by (Pandey et al. 2011).

- Extensive studies on genetically characteristics of the Motu breed may be done.
- The production and conservation techniques must be extended to the common people for its popularization and commercialization.
- Awareness must be created among the people regarding conservation of the Motu breed.
- Creation of awareness among farmers, about the socio-economic benefits of improving the local cattle and buffaloes;
- Evaluate the economic and other benefits of local breeds in the context of village situation.
- Involve community and Panchayati Raj Institution (PRI) in conservation of local breeds.

It is therefore important that Indigenous breeds of cattle should be conserved, developed and proliferated.

Conclusion

Motu cattle breed is remarkably adapted to the stressed environmental conditions of the region, where pastures are diminishing and shortage of dry and green fodder is prevalent. Frequent droughts, inappropriate management skills and dominance of small holdings are the reasons for insufficient feed and fodder. Motu breed is reared under extensive production system with very little inputs. These animals emerged as a major source of sustenance for under privileged people residing in Odisha. Primary requirements for overall improvement of Motu cattle breed are organized breeding strategies, management and conservation for which population diversity data deciphered in current paper is imperative. The indigenous cattle breed Motu has valuable characteristics such as disease resistance, high fertility, good maternal quality, longevity and the unique capacity to use low quality feed as well as the ability to adapt to harsh and tough environments. It is consequently critical that the cattle breed such as Motu must be maintained, developed and spread for their draught capacity, disease resistance and heat tolerance.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Acknowledgments

The authors acknowledge financial support of OUAT, Bhubaneswar and ICAR-ATARI, Kolkata for support

References

- 1) Das B.C., Das, J. 2016. Report on. "Biodiversity of Domesticated Animal in. Orissa"., Livestock Biodiversity of Odisha. Odisha Review, 53-58.
- 2) Dash S.K., Sethi B.P. 2007. Cattle Genetic Resources of Orissa, Orissa Livestock Resources Development Society.
- 3) Dash S.K., Sethi B.P., Rao P.K. 2013. Evaluation of Binjarpuri cattle of India in the native tract, International Journal of Livestock Production, 4(7): 102-105.
- 4) Dey D. 2017. Sahiwal – a policy pointer in Indian context. Journal of Livestock Science 8: 88-91
- 5) Gandhi R.S., Sharma A. 2016. Conservation of livestock diversity in India under current scenario. Indian Dairyman.
- 6) Jianqin S., Leiming X., Lu X. 2015. Effects of milk containing only A2 beta casein versus milk containing both A1 and A2 beta casein proteins on gastrointestinal physiology, symptoms of discomfort, and cognitive behavior of people with self-reported intolerance to traditional cows' milk. Nutrition Journal: 15(35)<https://doi.org/10.1186/s12937-016-0147-z>.

- 7) Karami M., Palizdar M.H., Almasi M.S. 2018. The effect of different processing of corn grain on gas production kinetics and in vitro digestibility in Taleshi cows. *Journal of Livestock Science* 9: 101-106.
- 8) Kokaeva M.G., Temiraev R.B., Dzhaboeva A.S., Osikina R.V., Gazzaeva M.S., Shugusheva L.H., Sattsaeva I.K., Nerovnykh L.P., Arutyunova G.Y., Efendiev B.S. 2020. Method for increasing the ecological and food values of milk and dairy products. *Journal of Livestock Science* 11: 14-19
- 9) Ngono Ema P.J., Manjeli Y., Meutchieyié F., Keambou C., Wanjala B., Desta A.F., Ommeh S., Skilton R., Djikeng A. 2014. Genetic diversity of four Cameroonian indigenous cattle using microsatellite markers. *Journal of Livestock Science* 5: 9-17
- 10) Panda L.K., Mishra M. 1990. Characteristics and Performance of Motu Cattle. *Indian Journal of Animal Production and Management*, 6(4): 213-217.
- 11) Pandey A.K., Sharma R., Singh L.V., Maitra A., Mishra B.P. 2011. Microsatellite based genetic characterization of Motu cattle. *The Indian Journal of Animal Sciences* 81: 519–20.
- 12) Patel J.H., Prajapati K.B., Sheikh A.S., Patel M.D., Chaudhari S.S., 2016. Traditional feeding practices adopted by professional breeders of Kankrej cattle in Banaskantha district of Gujarat state. *Journal of Livestock Science* 7: 49-53
- 13) Patra, D. 2016. The Koyas: A Socio-Cultural Study, *Odisha Review*, ISSN 0970-8669, 83-86.
- 14) Pundir R.K., Niranjan S.K., Behl R. 2013. Sustainable utilization of indigenous animal genetic resources of India. National Bureau of Animal Genetic Resources, Karnal, Haryana, India, pp.-208
- 15) Raja K.N., Jain A., Tantia M.S., Sharma H., Sharma R., Ahlawat S. 2020. Genetic diversity status of only registered cattle breed of Chhattisgarh–Kosali, *Indian Journal of Animal Sciences* 90 (6): 873–878.
- 16) Savalia K.B., Ahlawat A.R., Gamit V.V., Parikh S.S., Verma A.D. 2019. Recently Recognized Indigenous Cattle Breeds of India: A Review. *International Journal of Current Microbiology and Applied Science* 8(12): 161-168.
- 17) Sharma R., Pandey A.K., Singh Y., Prakash B., Ahlawat S.P.S. 2006. Assessment of genetic variability in Gangatiri cattle by micro-satellite markers. *Korean Journal of Genetics* 28(1): 35- 42.
- 18) Sharma R., Ahlawat S., Sharma H., Bhagat R.L., Singh P.K., Tantia M.S. 2020. Identification of a new potential native Indian cattle breed by population differentiation based on microsatellite markers, *Molecular Biology Reports* 47: 6429–6434.
- 19) Sodhi M. , Mukesh M., Kataria R.S, Mishra B.P., Joshi B.K. 2012. Milk proteins and human health: A1/A2 milk hypothesis, *Indian Journal of Endocrinology and Metabolism*, 16(5): 856.
- 20) Sharma J.K., Singh N.K. 2020. Economic studies on unorganized dairy farms in Jaipur region of Rajasthan. *Journal of Livestock Science* 11:127-132
- 21) Srivastava A.K., Patel J.B., Ankuya K.J., Chauhan H.D., Pawa, M.M. and Gupta J.P. 2019. Conservation of Indigenous Cattle Breeds. *Journal of Animal Research*, 9(1): 1-12.
- 22) Swiss Agency for Development and Cooperation 2004. Proceedings and Presentations of the Workshop held at Bhubaneswar, India, on 6th and 7th February, New Delhi.
- 23) www.nbagr.res.in, ICAR-NBAGR,2017, Newsletter.