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EFFECT OF DIFFERENT ROOF HOUSE ON PHYSIOLOGICAL AND BLOOD PARAMETERS OF SWAMP BUFFALO CALVES OF ASSAM*

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ABSTRACT

In the present investigation, the physiological and blood parameters of swamp buffalo calves of similar age and average body weight of Assam housed under different roof coverings were studied. The calves were randomly allocated to Treatment 1 (T_1), 2 (T_2) and 3 (T_3) with asbestos roof, asbestos roof with bamboo ceiling, and thatch roof house respectively. The calves were provided with *ad libitum* chaffed green forages like Maize, Napier, Para, and Cowpea along with concentrate mixture at the rate of 0.5 per cent of their bodyweight. The overall mean respiration rate and pulse rate of calves were recorded to be 21.07 ± 0.13, 20.95 ± 0.17 and 20.89 ± 0.16; 60.61 ± 0.10, 60.37 ± 0.10 and 60.38 ± 0.11 per minute in T_1, T_2 and T_3 groups respectively. The overall mean rectal temperature was found to range from 38.2°C to 38.3°C. The overall blood glucose level was recorded as 72.61 ± 2.11, 72.22 ± 2.17 and 74.21 ± 2.35 mg/dl in T_1, T_2 and T_3 groups respectively. No significant difference was observed in the above parameters among the three groups. No significant difference was also observed in total serum protein, sodium, potassium, and haemoglobin levels among the groups. The thatch was observed to be the better roof material to create beneficial microenvironment around the buffalo calves by reducing thermal stress.

Key words : Swamp buffalo, physiological and blood parameters, different roof coverings

Buffaloes of Assam are basically swamp type and they are more or less adapted to hot and humid climates of North Eastern Region of India. Generally buffaloes of this region are used for cultivation of paddy and other cereal crops, rural transport, pulling of carts, extracting juice from sugarcane, extracting oil from seeds and threshing paddy etc. Besides these, there exists a tremendous scope for exploitation of male calves in terms of meat production. In the tropical countries there is marked reduction in feed intake, growth rate and overall productivity of buffaloes due to heat stress particularly in summer as buffaloes have poor heat dissipation mechanism.

Efficiently designed sheds can lessen the thermal stress to a marked extent enhancing feed intake, growth rate and overall productivity of buffaloes. Therefore, an attempt has been made to

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study the physiological and blood parameters of swamp buffalo calves of Assam housed under different roof coverings.

MATERIALS AND METHODS

The study was conducted with eighteen swamp buffalo calves of about 5-6 months of age (of either sex) in the month of March to May, 2007 at the "Network Project on Swamp Buffalo", College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22. The calves were housed under three different roof coverings with six calves in each on the basis of similarity in their age and average body weight. The calves were randomly allocated to Treatment 1 (T_1), 2 (T_2) and 3 (T_3) with asbestos roof, asbestos roof with bamboo ceiling, and thatch roof house respectively. The calves were provided with *ad libitum* chaffed green forages (Maize, Napier, Para, and Cowpea) in the morning and evening hours along with concentrate mixture at the rate of 0.5 per cent of their bodyweight.

The respiration rate, pulse rate and rectal temperature were recorded daily at 12 noon throughout the experimental period. The respiration rate was recorded by counting the movements of right flank while the pulse rate was recorded by palpating the middle coccygeal artery. The rectal temperature was recorded with the help a clinical thermometer.

The blood samples of calves were collected from jugular vein at the beginning and then at fortnightly intervals throughout the entire experimental period. A portion of blood sample was allowed to clot for serum separation. The freshly separated serum was centrifuged at 3000 rpm for 10 minutes and the supernatant was stored at -20°C. Another portion of blood sample was put in sterilized test tube containing anticoagulant (EDTA) for estimation of blood haemoglobin immediately after collection by using Haemometer (Sahli's technique).

The blood glucose level was estimated with the help of Spectrophotometer by using Merck Liqui ó™ Glucose kit and expressed in mg/dl of serum.

The inorganic sodium and potassium were estimated with the help of Spectrophotometer by using ELYTE 2 kit and expressed in m mol/ L of serum.

The total protein was estimated with the help of Spectrophotometer by using Ecoline^R Total Protein kit and expressed in g/dl of serum.

RESULTS AND DISCUSSION

The respiration rate, pulse rate, rectal temperature as well as glucose, protein, sodium, potassium and haemoglobin content in swamp buffalo calves of Assam are presented in the Table1.

The respiration rate did not differ significantly among the groups. The highest respiration rate was recorded in the calves of T_1 group. Few workers [3] observed lower respiration counts in buffalo calves housed under modified roofs like thatch and mud plaster roof. Other workers [7] did not find any significant difference of respiration rate in buffalo calves reared under different housing managemental conditions. The lower respiration counts were observed in cross bred calves under different managemental practices, like sprinkling of water, body wetting and thatch roofing due to alleviation of heat stress as reported by other workers[11].

The pulse rate did not differ significantly among the groups. A worker [5] also reported similar findings in buffalo calves reared under loose house, shed and shed with open space. Other workers [1] did not find any significant difference in pulse rate among the female buffalo calves reared under loose housing, loose housing and curtain during night, loose housing and bedding, and conventional barn. They also observed that the pulse rates were higher in evening than the morning in all groups.

The rectal temperature did not differ significantly among the groups. The highest and lowest rectal temperature was recorded in the

calves of T_1 and T_2 group respectively. A group of workers [7] also reported no significant difference in rectal temperature of buffalo calves (ranged from 37.12°C to 37.95°C) reared under brick lined floor, brick lined floor with permanent bedding, brick lined floor with weekly changed bedding, and dirt floor. The rectal temperature of calves reared under loose house and close barn was also not found to differ significantly. However, the calves were observed to be under certain amount of thermal stress as evident from higher respiration rate and rectal temperature as reported by certain workers[3]. Other workers[11] observed that the thatch and mud were excellent roof materials to create better microenvironment around the animal by reducing thermal stress.

The highest blood glucose level was recorded in the calves of T_3 group. No significant difference was observed in blood glucose levels among the groups. Few workers [2] reported a lower average blood glucose level in 9-11 months old buffalo calves reared in thatch and mud plaster roof house. In another study, other workers [4] observed an average high blood glucose level in calves reared under thatch roof and mud plaster roof house than the calves reared under loose house and close barn which can be attributed to the comfortable environment created by thatch and mud roof. Slightly higher values of glucose in the present study might be due to young age of the calves as blood glucose level (53.27 mg/dl) decreased with the advancement of age as reported by few workers [8]. The reduction of glucose level due to high ambient temperature with high humidity could be controlled by providing comfort to the animals through showering, wallowing or even rains as reported by certain workers[10].

No significant difference was observed in total serum protein levels of the calves among the three groups. Slightly higher values were recorded in the calves of T_3 group followed by T_1 and T_2. A group of workers [4] reported no significant effect on protein level of buffalo calves due to modification of roof. Other workers [1] also reported no significant effect in protein levels among the calves reared under loose housing, loose housing and curtain during night, loose housing and bedding, and conventional barn. Similarly non significant effect on protein level of buffalo calves could be observed due to various heat stress ameliorating practices, like body wetting and cool hour feeding as reported by certain workers[6].

The overall mean sodium and potassium levels were recorded to be higher in the calves of T_2 and T_3 group. No significant difference was observed in sodium and potassium levels of the calves among the three groups. Few workers [4] also observed no significant difference in respect of sodium and potassium levels of buffalo calves reared under loose house, thatch roof house and close barn. Apparently lower levels of sodium and potassium in the calves of T_1 group might be due to more heat stress. The low levels of sodium and potassium in buffalo calves reared under loose house might be due to more loss of electrolytes in urine and sweat due to thermal stress as observed by other workers [2].

Statistically the difference in haemoglobin level was not found to be significant among the groups. Certain workers [2] observed high haemoglobin level in buffalo calves reared under thatch roof and mud plaster roof house. Other workers [9] recorded high haemoglobin level in buffalo calves reared under loose house with thatch roof and loose house with mud plaster roof than loose house and close barn. The low haemoglobin level of buffalo calves in loose house might be due to haemodilution caused by a shift in body water from the intracellular and interstitial space as a consequence of the effect of hot condition. Low haemoglobin level in the calves reared under asbestos roof in the present study might be due to thermal stress.

Table 1. The respiration rate, pulse rate, rectal temperature as well as glucose, protein, sodium, potassium and haemoglobin content in swamp buffalo calves of Assam.

Groups	Physiological parameters			Blood parameters				
	Respiration/ minute	Pulse/ minute	Temperature (°C)	Glucose (mg/dl)	Serum protein (g/dl)	Sodium (m.mol/lit)	Potassium (m.mol/lit)	Haemoglobin (g %)
T_1	21.07 ± 0.13	60.61 ± 0.10	38.28 ± 0.01	72.61 ± 2.11	8.59 ± 0.09	138.92 ± 0.82	3.35 ± 0.05	8.76 ± 0.06
T_2	20.95 ± 0.17	60.37 ± 0.10	38.26 ± 0.02	72.22 ± 2.17	8.54 ± 0.06	139.54 ± 0.93	3.40 ± 0.06	8.83 ± 0.04
T_3	20.89 ± 0.16	60.38 ± 0.11	38.23 ± 0.01	74.21 ± 2.35	8.69 ± 0.08	140.34 ± 0.67	3.40 ± 0.05	8.89 ± 0.07

CONCLUSION

From the present investigation it may be concluded that the thatch roofing in particular and asbestos roofing with bamboo ceiling are effective heat ameliorating measures for generation of a beneficial microclimatic environment to house the growing buffalo calves in Assam with better feed intake as well as growth rate.

REFERENCES

1. Chakraborty, A.; Singh, N. and Yadav, R.S. (1996). Effect of winter management systems on physiological status of female Murrah buffalo calves. *Indian J. Anim. Sci*., **66**(1): 78-82.
2. Jat, R.P., Gupta, L.R. and Yadav, B.L. (2002) Effect of thatch and mud plaster roof house on certain blood constituents and behaviour of buffalo calves during rainy season. *Indian J. Anim. Prod. Mgmt*., **18**(1-2): 27-31.
3. Jat, R.P.; Gupta, L.R. and Meena, S.M. (2002). Effect of shelter management practices on feed intake and physiological responses in buffalo calves during summer. *Indian J. Anim. Prod. Mgmt.,* **18**(3-4): 124-127.
4. Jat, R.P.; Gupta, L.R.; Yadav, R.S.; Grewal, S.S. and Hari Om. (2004). Biochemical and Behavioural pattern in female buffalo calves as influenced by shelter management during summer. *Indian Buffalo J*., **2**(1): 51-55.
5. Karki, D.B. (1981). Effect of mode of housing during winter on growth, physiological and blood parameters of buffalo calves. M.Sc. thesis, Haryana Agric. Univ., Hissar (Cited by Sarma, 1991).
6. Kumar, D. and Gupta, L.R. (1991). Effect of some summer managemental practices on the growth, physiological and biochemical responses of buffalo calves. *Indian J. Anim. Prod. Mgmt*., **7**(2): 98-101.
7. Rohilla, P.R., Shri Ram and Kumari, R. (1990) Effect of shed floor on the physiological parameters of buffalo calves in winter. *Indian J. Anim. Prod. Mgmt.,* **6**(4): 1-4.
8. Shaffer, L.; Roussel, J.D. and Koonce, K.L. (1981). Effect of age, temperature, season and breed on blood characteristics of dairy cattle. *J. Dairy cattle. J. Dairy Sci*., **64**: 62-70.
9. Singh, Y.; Grewal, S.S. and Yadav, B.L. (2000). Effect of certain summer management practices on blood parameters of buffalo calves. Proceedings of International conference on smallholder livestock production system in developing countries held at Thrissur, Kerala from 24-28th Nov.
10. Soni, P.L.; Gangwar, P.C.; Behga, C.S.; Srivastava, R.K. and Dhingra, D.P. (1982). Effect of cooling on certain blood metabolites and minerals in buffaloes. *Indian J. Anim. Sci*., **52**: 222-227.
11. Yazdani, A.R. and Gupta, L.R. (2000). Effect of housing and feeding systems of feed utilization and physiological responses in crossbred calves. *Indian J. Dairy Sci*., **53**(2): 88-92.

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