Hkkjrh; df"k vuqla/kku if=dk] **35**(4): 249-252 DOI: 10.18805/BKAP259

x.kl= fo'y"k.k d vk/kkj ij f=ijk jkT; e ub Lon'kh nynyh; Hkl dh vkcknh ÞHkkxkjß d vfLrRo dk irk pyrk g

dj.k ohj flag] jkeæ nkl*] lkdr fujtu] ekfudk lkgh ,o vkj- ,l- dVkfj;k
vkbl,vkj&jk"Vh; i'k vuokf'kdh lalk/ku C;jk] djuky&132 001] gfj;k.kk] Hkkjr

ikIr% tuojh 2021 Lohdr% tuojh 2021

lkjk'k

oreku v/;;u dk mí'; Hkkjr d mÙkj&ioh jkT; f=ijk dh ÞHkkxkjß Hkl dh vkcknh dh fLFkfr dk x.kl= fo'y"k.k d vk/kkj ij voykdu djuk gA Hkkjr d mÙkj&ioh jkT;k l vcrd Hkl dk v/;;u f=ijk vkj e?kky; dk NkMdj fd;k tk pdk g vkj vkerkj ij bUg ny nyh; Hkl dk çdkj dk ekuk tkrk g] tk fd Hkl dh 'kkjhjhd ljpuk dh lekurk ij vk/kkfjr gkrk gA ?kjy Hkl ¼ccyl ccfyl½ dk nynyh; vkj unh; e oxh—r fd;k x;k gA gkykfd] mudk ldj mÙkj&io Hkkjr e vle ¼cãi= ?kkVh½ d dN fgLlk e Hkh ik;k tkrk gA nynyh; Hkl dh ,d fof'k"V 'kkjhjhd ljpuk gkrh g tl lhx dk vkdkj] 'kkjhj dk NkVk vkdkj] vkj 'kjhj dk jx] vkfnA ;g v/;;u f=ijk jkT; e Hkkxkj Hkl dh vkcknh dk fo'y"k.k djrk gA jkT; Hkj l ,d= Hkl d jä ueu dk x.kl= dh l[;k fu/kkfjr dju d fy, mi;qDr fd;k x;kA geu f=ijk jkT; l ÞHkkxkjß Lon'kh Hkl dh vkcknh dk igyh ckj x.kl= fo'y"k.k dk mi;qDr djd nynyh; Hkl çtkfr dh if"V dh g lHkh tkuojk dk ey :i l x.kl= 2N¾48 g

'kCn dth: Hkkxkj] x.kl=] unh; Hkl

Bhartiya Krishi Anushandhan Patrika, **35**(4): 249-252

Cytogenetic analysis reveals the swamp status of the indigenous "Bhangor" buffalo population from Tripura state

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ABSTRACT

The domestic water buffalo (Bubalus bubalis) are classified into the swamp and riverine. However, their hybrids are also found in some parts of Assam (Brahmaputra Valley) in North-east India. Swamp buffaloes have a typical phenotypic appearance, like the shape of horns, small size and body-color, *etc*. This study characterizes the indigenous 'Bhangor' buffalo population from the Tripura state using cytogenetic analyses. The blood of buffaloes samples were collected across the state, phenotypically identified as swamp buffaloes were cultured, terminated and harvested using conventional karyotype protocol to determine the number of chromosomes. We have characterized 'Bhangor' an indigenous buffalo population from Tripura state using karyotypic analysis for the first time to confirm that all animals phenotypically identified as swamp buffaloes with 2N=48 chromosomes.

Key words: Bhangor, Karyotyping, Water buffaloes.

çLrkouk

Hkl] ccyl ccfyl ,d ikyr tkuoj g tk—f"k] vFk0;oLFkk vkj [kk| mRiknu e vfr vko';d Hkfedk fuHkkr gA Hkl ykxk d fy, vfo'oluh; :i l egRoi.k g vkj bUg db n'kk e0;kid :i l ik;k tkrk g] ftle Hkkjrh; miegk}hi] nf{k.k io ,f'k;k] phu] bVyh vkj v,LVfy;k d egknhi 'kkfey g ¼ckjxh vkj ekth 2005] dnhiu ,V vy 2009½A Hkkjr e ge Hkl dh 17 ith—r ifjHkkf"kr 132 uLy vkj fofHkUu Lon'kh vkcknh feyrh g ftUg vk.kfod ekdjk d lkFk&lkFk QukVkbfid fof/k }kjk of.kr fd;k x;k g ¼vkbl,vkj&,uch, thvkj] 2020½A mÙkj&io e f=ijk ,d ,lk jkT; g tgk Hkl vkcknh dk foLrr :i

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f=ijk i'k/ku fodkl ,tsalh ¼TLDA½] i'k lalk/ku fodkl foHkkx] f=ijk&799 277] Hkkjr
Tripura Livestock Development Agency (TLDA), Animal Resources Development Department, Tripura-799 277, India.

l voykdu ugh fd;k x;k gA ;gk geu lkbVk tufVd Vy vkj QukVkbfid fof/k dk mi;kx djr g, Lon'kh Hkl vkcknh dk oxh—r vkj fpfàr dju dk ç;kl fd;k gA Hkxkj Hkl ikyu oky fdlkuk }kjk fd, x, çc/ku vH;klk dk Hkh v/;;u fd;k x;kA

LFkkuh; ykxk }kjk nlh Hkl dk Hkxkj ;k ef.kijh d uke l tkuk tkrk gA f=ijk ,d Hkfe&cn ¼yM&y,DM½ jkT; g vkj bldh Hkkxkfyd lhek, jk"Vh; vkj vrjk"Vh; nkuk lhekvk dk Nrh g] vkj cgr gh ldh.k :i l ;g Hkkjrh; jkT;k vle vkj fetkje d lkFk io e feyrh gA 10]491 fdeh 2 ¼4]051 ox ehy½ d {k= okyk ;g rhljk lcl NkVk Hkkjrh; jkT; g] tk E;kekj vkj ckXykn'k dh unh ?kkVh d chp fLFkr gA bl bykd e cM ieku ij lekukrj igkfM;k vkj ?kkfV;k g tk mÙkj&if'pe l nf{k.k&io fn'kk dh vkj gA nynyh; Hkl dk e[;:i l /kku d [krk e mi;kx vkj ekl d fy, ikyk tkrk gA e[;r; ;g Hkkjrh; iokrj jkT;k e ikb tkrh gA 'kkjhfjd ljpuk e] nynyh; Hkl unh; Hkl k l vkdkj e NkVh gkrh g vkj viuk T;nkrj le; nyny ikuh e xtjrh g ¼Borghese *et al* 2005½A

oreku v/;;u dk mí'; f=ijk l Hkkxkj Hkl vkcknh dh fLFkfr dk vkdyu djuk gA Hkkjr d f=ijk d vykok mÙkj&ioh jkT;k e vc rd Hkl k dk tufVd vkj QukVkbfid v/;;u dj fy;k x;k g] ftUg vkerkj ij nynyh; çdkj dk ekuk tkrk g tk nynyh; çdkj dh Hkl k d QukVkbfid lekurk ij vk/kkfjr gkrk gA gky gh e dj.k ohj flg ,V vy] 2020 e e?kky; jkT; e nynyh; Hkl k d vfLrRo dk n'kk;k FkkA

lkexh ,o ijh{k.k fof/k

e,QkefVd MVk lxg

jkT; d i'kikyu foHkkx d lg;kx l ik;yV lo{k.k d nkjku fdlkuk d fuokl] forj.k] çc/ku çFkkvk vkj fdlkuk dh lkekftd&vkFkd fLFkfr d ckj e tkudkjh ç'ukoyh d ek/;e l ,d= dh xb FkhA vkblh,vkj&,uch,thvkj d uLy fooj.kd e of.kr ekud y{k.kk ij e,QkefVd MVk if'pe f=ijk] [kkokb] /kykb] mukdkfV] xkerh] vkj f=ijk jkT; d mÙkjh f=ijk ftyk l 230 o;Ld Hkl k l nt fd;k x;k FkkA fofHkUu xkok l vlcf/kr tkuojk l jä d ueu Hkh ,d= fd, x, FkA

x.kl= fo'y"k.k ¼Cytogenetic analysis)

çdk'k ,V vy ½2011½ }kjk of.kr jä Y;dklkbV thok.kvk dh of) fof/k ekeyh l'kk/kuk d lkFk vkjh,evkb 1640 ¼RPMI½ ek/;e dk mi;kx dj 2% Phyto Haem Agglutinin ¼PHA½ d lkFk bLreky dh xbA Å"ekfu;=d e 37 fMxh lfYl;l ij 72 ?kV d Å"ek;u d ckn eVkQt x.kl= çlkj dh r;kjh dh xb A çR;d tkuoj d de l de ikp LykbM dh LØhfux djd ifj.kkek dh if"V dh xbA

ifj.kke ,o foopuk

f=ijk jkT; dh Hkxkj Hkl k d 'kkjhfjd eki nt fd, x, vkj mudk eY;kdu fd;k x;k FkkA Hkl dh Ropk vkerkj ij Hkj jx dh gkrh gA ,d 0;kid vk/kkj d lkFk lhx gfl; d vkdkj dk gkrk g tk T;knkrj Åij ;k ihN dh vkj ?ke gkr gA dkuk dk {kfrt :i l j[kk tkrk gA ekFkk T;knkrj mÙky gkrk gA Hkl e/;e vkdkj vkj gA [kjk vkj ?kVu d chp dk ij dk Hkkx lQn jx dk gkrk gA iN d cky vke rkj ij dky gkr g ¼fp= l[;k 1] 2½A bu Hkl k dk mi;kx e[;:i l —f'k dk;kd fy, fd;k tkrk g n/k dh inkokj 2&2-5 yhVj çfrfnu gA bUg cPpk d fy; NkM fn;k tkrk gA tkuojk dk e[;:i l ,d 'kU;&buiV ç.kkyh d rgr ikyk tkrk gA tkuojk dk mi;kx ikjifjd R;kgkj e cfynku d fy, Hkh fd;k tkrk g] gkykfd bl Hkkjrh; mPpU;k;ky; d vkn'k }kjk çfrcf/kr fd;k x;k gA

fp= 1% Hkkxkj Hkl eknk i'kA

fp= 2% Hkkxkj Hkl uj i'kA

Hkkxkj Hkl dh x.kl= fo'k"krk,

;g f=ijk jkT; e Lon'kh Hkkxkj vkcknh d x.kl= fLFkfr ij igyh fjikV gA Hkkxkj Hkl e nynyh; çdkj dh Hkl dh fof'k"V x.kl= fo'k"krk, gA f=ijk jkT; d fofHkUu LFkkuk l ,d= fd, x, nkuk fyxk d 72 jä ueuk dk mi;kx x.kl= fo'y"k.k d fy, fd;k x;k FkkA tkuojk d jä ueuk u 2N ¾ 48 x.kl=k dh f}xf.kr fxurh çnf'kr dh] tk nynyh Hkl dh fo'k"krkvk d fy, fof'k"V g ¼ckxk ,V vyA 1984] lr 1987½A dfj;kVkbi e 23 v,Vkl ke tkM ¼autosome½ vkj ,d tkMh lDl Økeklke 'kkfey FkA v,Vkl kE l d 23 tkM e 5 i{kikrh ¼eVlfUVd / lceVlfUVd½ vkj 18 ,Økdfvd x.kl= gkr gA nynyh Hkl e eVkl fUVd x.kl=k dh pkFkh tkMh dh fof'k"V vkdkj dh fo'k"krk] unh d çdkj d x.kl= l[;k 4 ¼4p½ vkj 9 ¼DiBerardino vkj Iannuzzi 1981] pk/kjh ,V vy 1989½ d foy; d ifj.kkeLo:i gkrh gA

bl çdkj x.kl= fo'y"k.k u mÙkj&io Hkkjr d Hkkxkj Hkl dh nynyh fLFkfr dh if"V dhA feJk ,V vy ½2010 ,½ u ef.kij l ,d= Hkl x.kl= fo'y"k.k fd;k Fkk vkj 'k) nynyh çdkj dh Hkl dh if"V dhA vlfe;k Hkl x.kl= fo'y"k.k o.ku u 'k) unh; vkj ldj Hkl nkuk dh mifLFkfr dk [ykl k fd;k yfdu dkb nynyh çdkj dh Hkl ¼feJk ,V vy 2010 ch½ ugh gA

fu"d"k

f=ijk jkT; dh Hkkxkj Hkl e x.kl= fo'y"k.k o.ku ,d uohurk fjikV gA Hkl vkcknh e dkb :ikRed ;k Øeklkey vlkekU;rk ugh n[kh xbA ;g Hkkjr d f=ijk jkT; e 'k) nynyh çdkj dh Hkl k d vfLrRo dh igyh if"V gA mÙkj&io og {k= g tgk unh vkj nyny nkuk d lkFk&lkFk ldj Hkh ekt n gA pfd nyny Hkl dh vkcknh e Hkkjh fxjkoV vkb g] bl vf}rh; telykTe d fy, çtuu vkj lj{k.k dk;Øe d fy, rRdky gLr{ki dh vko';drk gA

Loh—fr;k

y[kd 'kk/k dk; dju e lgk;rk d fy, fun'kd] ICAR- NBAGR] djuky dk /kU;okn nuk pkgr gA y[kd f=ijk e Hkl d jä d ueuk d lxg d nkjku ,,p vkj i'k fpfdRlk lok foHkkx d fun'kd] l;ä fun'kd vkj i'k fpfdRlk vf/kdkfj;k d dke vkj lgk;rk d fy, mud lfØ; leFku d fy, /kU;okn nuk pkgr gA

lnHk

Bidhar, G.C., Patnaik, C.R., Rao, P.K. and Patro, B.N. (1986). Chromosome number and morphology of Paralakhemundi buffaloes in Orissa. *Buffalo Bulletin*. **5:** 54-56.

Borghese, A. (2005).Buffalo production and research. FAO Ed. *REU Technical Series*. **67:** 1–315.

Borghese, A., Mazzi, M. (2005). Buffalo population and strategies in the world. In: Buffalo production and research. Rome: FAO;

Bongso, T.A., Baya, Z.H., Duron, P.G., Homongan, V.G., Campos, E. and Ranjhas, S.J. (1984). Segregation of mitotic chromosomes in river, swamp and crossbred water buffaloes (Bubalus bubalis). *Tropical Veterinarian*. **2:** 177-182.

Chowdhary, B.P., Gustavsson, I., Kunnevongkrit, A., Lohachit, C. and Makinen, A. (1989). Detailed mitotic description of the tandem fusion translocation differentiating river and swamp buffalo. *Buffalo Journal.* **1:** 41-49.

Das, A., Das, D., Goswami R.N., Das, G.C. and Bhuyan, D. (2005). Performance of swamp buffaloes of Assam in respect of some economically important traits of reproduction under farm condition. *Buffalo Bulletin.* **24**(2): 25-28

DiBerardino, D. and Iannuzzi, L. (1981). Chromosome banding homologies in swamp and Murrah buffalo. *Journal of Heredity*. **72:** 183-188.

Kandeepan, G., Biswas, S., Rajkumar, R.S. (2009). Buffalo as potential food animal. *Int. J. Livest Prod*. **1**(1):1–5.

Karan veer singh, Uma kant verma, Manisha Arora, R.S. Kataria and Saket Niranjan (2020). Cytogenetic analysis reveals existence of swamp buffalo population in Meghalaya. *Indian Journal of Animal Sciences,* **90** (6): 868–870.

Lei, C.Z., Zhang, W., Chen, H., Lu, F., Liu, R.Y., Yang, X.Y., Zhang, H.C., Liu, Z.G., Yao, L.B., Lu, Z.F. and Zhao, Z.L. (2007). Independent maternal origin of Chinese swamp buffalo (*Bubalus bubalis*). *Animal Genetics.* **38:** 97-102.

Livestock Census (2012). Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India, New Delhi.

Mathur, P.K., Malik, P.K. and Muley, P.D. (1995). Ecology and population genetics of Asian Wild Buffalo (*Bubalus bubalis L.*) in India. Project report. pp. 54. Wildlife Institute of India, Dehradun.

Mishra, B.P., Prakash, B., Kataria, R.S., Kathiravan, P., Sadana, D.K., Das, G.C., Joshi, B.K., Bhasin, V., Rasool, T.J. and Bujarbaruah, K.M. (2010a). Cytogenetic profiling and mitochondrial DNA analysis reveal existence of swamp buffalo population in Manipur state. *Indian Journal of Animal Sciences.* **80:** 31-36.

Mishra, B.P., Prakash, B., Kataria, R.S., Sadana, D.K., Kathiravan, P., Das ,G.C., Goswami, R.N., Joshi, B.K., Bhasin, V., Rasool, T.J. and Bujarbaruah, K.M. (2010b). Genetic diversity analysis and cytogenetic profiling of Assamese buffaloes from North-East India. *Indian Journal of Animal Sciences*. **80:** 142-147.

Prakash, B., Mishra, B.P., Kataria, R.S., Das, G.C. (2011). Cytogenetic analyses detect presence of riverine, swamp and their hybrid buffaloes in North-east. *J. Livest. Biodiver.* **3:** 17–22.

Sat, L.M. (1987). Cytogenetic analysis of buffalo chromosomes. Ph.D. Thesis. Kurukshetra University, Kurukshetra, India.

Tamuly, B.C., Bora, N.N. and Pathak, N.N. (1982). Some information on the swamp buffaloes of Assam. *Dairy Guide.* **4:** 56-60.

The Department of Animal Husbandry and Veterinary, Tripura state (2019). http://ardd.tripura.gov.in

Yadav, B.R., Balakrishnan, C.R., Balain, D.S. and Kumar, P. (1990). Cytogenetic confirmation of the presence of swamp buffaloes in India. Proceedings 2nd World Buffalo Congress, New Delhi, India **11:** 174–177.