

From Director's Desk...



The conservation and sustainable utilization of natural resources including biodiversity is one of the prime issues at global level today. The declaration of 2011-2020 as the United nation Decade on Biodiversity is a step in this direction. The domesticated animal diversity is an important component of Agro-biodiversity. India being the mega biodiversity country is endowed with diverse ecosystems and habitats, harboring rich livestock diversity, is now more concerned about its maintenance, sustainable utilization and conservation. National Bureau of Animal Genetic Resources, a nodal agency recognized at national level for this cause is committed to explore and know more about the domestic animal populations that have been reared by the

farmers since long time but fail to find the place in the list of documented and registered breeds. These farm livestock populations are in addition to 135 breeds already well described, documented and registered as breeds. The preliminary information generated while characterizing the populations like Kalahandi buffaloes of Odisha, Bundelkhandi goats of Bundelkhand region of UP & MP states have been given in this document. Meat quality related genes namely GDF8 in sheep and Fatty Acid Synthase (FASN) in buffaloes have been studied to know the variability at gene level. The national gene bank maintained at bureau is enriched regularly by adding more and more semen collected from elite breeding males confirming to respective breed characteristics in the breeding tract of different livestock species. The gene bank also serves as an outlet for disseminating the germplasm to be used in field for *in situ* conservation at local animal keepers and suitable institutional herds/ flocks. The progress of research projects was reviewed in the timely held IRC. The work done under the network project was deliberated and appreciated in the 10th Network Scientists' meet. Efforts are on for more detailed study to develop database and computing methodologies, characterization, evaluation, conservation and utilization of AnGR through value addition and enhancing productivity using traditional and advanced molecular breeding techniques. These programmes have been reflected in NBAGR Vision 2025. The EFC of NBAGR for XIIth plan is under preparation through collective deliberations of bureau's scientists as well as interactive meetings with stake holders and other concerned experts. Apart from the research, the staff of bureau participated in other institute building and social activities. Various dignitaries visited bureau during the second half of the year. An audio CD of newly composed NBAGR Song was released by honorable DDG (AS), Dr. KML Pathak. Scientists published their findings in high impact research journals. Some scientists were deputed for getting trainings in leading international laboratories. I feel immensely pleased to put foreword of 2nd issue (Vol. 8) of Bureau's News Letter which presents the glimpses of activities of the bureau and hope that information presented in this issue will be useful to its readers. We solicit comments and suggestions for the betterment of our efforts.



(Dr. B.K. Joshi)

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Sectoral News

FAO Guidelines for molecular genetic characterization of livestock

As part of its Animal Production and Health Guidelines series, FAO has just published "Molecular genetic characterization of animal genetic resources". The guidelines' broad objective is to provide guidance on performing molecular genetic characterization studies on animal genetic resources. In the eighty five page book, a short overview of progress in molecular genetic characterization of animal genetic resources over the last two decades and prospects for the future is followed by a section that provides practical advice for researchers who wish to undertake a characterization study. Emphasis is given to the importance of obtaining high-quality and representative biological samples, yielding standardized data that may be integrated into analyses on an international scale. Appendices provide a glossary of technical terms; examples of questionnaires; an example of a simple material transfer agreement; a summary of software that can be used to analyse molecular data; and panels of microsatellite markers. FAO and the ISAG-FAO Advisory Group on Animal Genetic Diversity have proposed panels of thirty microsatellite markers for nine major livestock species. The

guidelines were evaluated at workshops in Poland and Austria and subsequently presented to, and endorsed by, the Commission on Genetic Resources for Food and Agriculture at its Thirteenth Regular Session on 18-22 July 2011. Ideally, studies should characterize the target populations using all thirty markers. This approach not only yields more accurate data than using a subset of the markers, but also offers more opportunity for comparisons with results from previous studies undertaken with various subsets of the Thirty markers. (<http://www.fao.org/docrep/014/i2413e/i2413e00.pdf>, 1MB). The guidelines will be refined and updated periodically as experience with their use in the field is accumulated and as technologies for molecular characterization advance. The assistance of the National Coordinators for the Management of Animal Genetic Resources and their country networks will be particularly important to this process of revision. The use of genetic marker information in prioritization of breeds for conservation has been reviewed and will be discussed in the forthcoming FAO guidelines on *in vivo* conservation of animal genetic resources.



United Nations decides, following the invitation of COP-10, to declare 2011-2020 the United Nations Decade on Biodiversity, with a view to contributing to the implementation of the Strategic Plan for Biodiversity 2011-2020.

Strategic Objectives for the Decade

- Supporting framework for implementation of the Biodiversity Strategic Plan 2011-2020 and the Achievements of Biodiversity Targets at national, regional and international levels
- Guidance to regional and international organizations
- Public awareness of biodiversity issues.

RESEARCH ACCOMPLISHMENTS

Unique Kalahandi buffaloes from Odisha: A survey was carried out by National Bureau of Animal Genetic Resources (NBAGR) jointly with Orissa Livestock Resources Development Society (OLRDS) in the home tract of Kalahandi buffalo. The findings of the survey concluded that Kalahandi areas which remained untouched by AI centers, till date, harbour the Kalahandi buffaloes in its pure form. Animals have adaptability to low-input livestock management system. A concrete plan for its conservation and improvement in its native tract with participation of farming community has been prepared for preserving the bio-diversity. Kalahandi is a unique buffalo population and needs conservation, as the animals are sustainable with potential to support the local agriculture of Odisha.



Herd of Kalahandi buffalo

Nucleotide diversity in candidate genes for mutton quality traits in Indian sheep: Polymorphism in the promoter, exon 1 and intron 1 region of GDF8 gene was surveyed on a panel of indigenous sheep by SNP analysis. Three SNPs were detected, two in promoter and one in intron1 region. Seven singletons and 2 indels were also detected. No nucleotide variation was detected in the region of the first exon. Sequencing revealed one new SNP specific to Indian sheep breeds in addition to two previously described SNPs. The presence of the favorable allele (although at low frequency), associated with increased forequarter weight and meat tenderness suggests its dispersal in Indian breeds too.

Characterization of Buffalo Fatty Acid Synthase gene: Buffalo Fatty Acid Synthase (FASN) gene related to meat quality was characterized by PCR amplifying Thioesterase (TE) region of FASN gene along with 3'UTR overlapping fragments. The TE domain plays essential role in determination of product chain length of FASN and is responsible for differences in fatty acids compositions. A total of about 1.4 kb region of FASN gene amplified was sequenced comprising exon39 to 42, which revealed a total of 42 nucleotide changes 32 of them specific to buffalo, when compared with cattle. A total of 12 nucleotide insertions and one nucleotide deletion were also found in intronic region of all buffalo sequences compared to cattle. Conceptualized amino acid sequence analysis showed eight amino acid changes in buffaloes as compared to cattle. There was no change in the amino acid sequence between river and swamp buffalo. Sequence analysis of Exon 34 region revealed three nucleotide substitutions including one non-synonymous type in water buffalo compared to cattle that has been found to be associated with fatty acid composition of back fat, inter and intra-muscular fat in beef cattle. Similarly, three substitutions were also observed in intron 34 region of buffalo than cattle. However, no nucleotide variation was observed among the different breeds of buffalo. Screening of 12 buffaloes, six each from riverine and swamp types revealed presence of seven polymorphic nucleotide sites, five of them in 3'UTR and two in exons 39 and 41. One of the nucleotide changes observed at position 18996 was specific between swamp and riverine buffaloes. The initial results thus indicate buffalo specific nucleotide and amino acid changes, which could have functional implication, changing the fatty acid composition of milk and meat compared to cattle.

Nucleotide position	Region	Change
17863	Exon39-CDS	G/A (Synon)
18433	Exon41-CDS	A/G (Synon)
18980	Exon42-3'UTR	C/T
18995	Exon42-3'UTR	A/G
18996	Exon42-3'UTR	A/G
19056	Exon42-3'UTR	T/C
19937	Exon42-3'UTR	C/T

Polymorphism in TE domain/3'UTR of buffalo FASN

Genetic diversity in Bundelkhandi goats: Bundelkhandi goats inhabit the Bundelkhand region of Uttar Pradesh and Madhya Pradesh and are yet to be studied in detail for their phenotype and genotype. These animals having jet black coat are large sized and hardy. They sustain well in the extreme hot climatic conditions of its habitat. The Bureau has attempted to characterize this lesser known population using a battery of 25 microsatellite markers. The blood samples for isolating the DNA were collected from the fifty representative animals belonging to different flocks maintained at organized farm of IGFR, Jhansi as well as from the farmers' flocks in the field. The analysis of genotypic data revealed that the number of alleles observed across the studied microsatellite loci varied from 2 to 20 with an overall mean of 11.08. The effective number of alleles across the loci was less than the observed number and varied from 1.87 to 9.00 with an overall mean of 4.96. PIC value ranged from 0.54 to 0.91 with an average 0.82 which clearly indicated the suitability of markers for Bundelkhandi goats. The average expected heterozygosity within the population ranged from 0.06 to 0.89 with an average of 0.73, whereas observed heterozygosity ranged

from 0.06 to 0.98 with an average of 0.69. The gene diversity across the studied loci varied from 0.24 to 0.90 with an overall mean of 0.7. The L-shaped mode-shift curve drawn for Bundelkhandi population indicated the absence of any bottle neck in the recent past.

Ex-situ conservation: Presently about 1 lakh frozen semen from seven species (Cattle, Buffalo, Goat, Sheep, Camel, Horse and Yak) are stored in Gene Bank for posterity. The details regarding phenotypic characters, health status, semen quality of animals is maintained and semen motility is checked on yearly basis. A total of 5865 semen doses consisting of 1400 doses from seven Nili Ravi and 4465 doses from seventeen Surti buffalo bulls were added to the National Gene Bank during the second half of the year 2011 (July to December)

ITMU Cell activities: The ITMC meeting was held on 12th September 2011 with the agenda of discussion on four patent applications and issue of commercialization of the technology "Parentage verification kit for buffaloes and Zebu cattle" submitted by Dr. R.K. Vijh and others. Following three patents were filed to the Indian Patent Office, Delhi:

SN	Application No.	Inventors	Patent Title	Date of filing patents
1	3773/DEL/2011	Dr. Ramesh Kumar Vijh, Priyanka Banerjee, Jyoti Joshi, Upasana Sharma	A Kit for Parentage Verification in Zebu Cattle (<i>Bos Indicus</i>)	22-Dec-11
2	3774/DEL/2011	Dr. Ramesh Kumar Vijh, Priyanka Banerjee, Jyoti Joshi, Upasana Sharma	A Kit for Parentage Verification in Camels (Single and Double Hump)	22-Dec-11
3	3775/DEL/2011	Dr. Ramesh Kumar Vijh, Bina Mishra, Priyanka Banerjee, Jyoti Joshi, Upasana Sharma, M.S. Tantia	A Kit for Parentage Verification in Buffaloes (<i>Bubalus Bubalis</i>)	22-Dec-11

OTHER ACTIVITIES

Important Meetings

- **Institute Research Committee (IRC):** Institute Research Committee meeting was held on 21st & 22nd October, 2011 under the Chairmanship of Dr. B.K. Joshi, Director, NBAGR. Final report of the completed projects and progress report of ongoing research projects were discussed.
- **Institute Management Committee (IMC):** Institute Management Committee was held on 5th November, 2011



IMC Meeting

• **An Interactive meet of NBAGR scientists** on revision of RPF's was held on 25.10.2011 with Dr. ML Madan, former DDG (AS) and Dr. VK Bhatia, Director IASRI, New Delhi. The revised format of RPF was discussed in this meeting and inputs were invited by the chairman.

• **10th Network Scientist Meet:** 10th Scientist Meet of Network Project on AnGR was held on 12th August 2011 under the chairmanship of Dr. KML Pathak, DDG (AS), ICAR, Delhi. Dr. Vineet Bhasin, Pr. Scientist, Animal Science Division, ICAR also attended the meeting. The in-charges of core labs under Network project and of buffalo genomics presented their reports. All the scientists from bureau participated in the discussion. The chief Guest also released NBAGR Profile and Audio CD of NBAGR



Dr KML Pathak, DDG (AS) addressing the scientists

Song on this occasion.

• One day interactive meet of stakeholders (Animal



A Farmer presenting his suggestions

Husbandry personnels & field veterinarians) was held on 19th November 2011.

• **Partner's Meet of the NAIP-NABG project:** One day Partner's Meet of project was held on December 19th, 2011 at NBAGR, Karnal. It was attended by scientists from participating institutes of NABG, institutes under Animal



Partner's Meet in Progress

Science Division of ICAR and the State Animal & Veterinary Science Universities.

Trainings/HRD

The Model Training Course on "Characterization and Conservation of Indigenous Livestock and Poultry Genetic Resources Under Field Condition" was organized from 15.11.2011 to 22.11.2011 sponsored by The Department of Agriculture & Cooperation, Ministry of Agriculture, GOI. A total of 34 officers from 14 different state animal husbandry departments were registered and participated in the 8 days training programme. It was organized to sensitize and create awareness about the importance of characterization, conservation and sustainable



Dr A K Srivastva, Director NDRI Karnal inaugurating the Model Training Course...

Fairs/ Exhibitions

NBAGR participated and organised Farm Animal Bio-Diversity Exhibition stall in the Livestock fair cum National Livestock Championship-2011 organised by Animal Husbandry Department, Punjab at Mukatsar (Punjab) during 17th to 19th December. NBAGR scientists were invited to act as member of panel for judging during the various breed competitions held at the fair.

Celebrations

The NBAGR staff and families celebrated 65th Independence day on 15th August, 2011. Dr B.K.Joshi, Director, NBAGR hoisted the tricolor. Children presented cultural programmes to mark this occasion.



Director unfurling the flag

28th NBAGR Foundation Day: Foundation day celebration was presided by Dr. M.L. Madan, former Deputy Director (AS) of Indian Council of Agricultural Research, Dr. A.K. Srivastava, Director cum Vice Chancellor, N.D.R.I. Deemed University, Karnal graced the occasion as guest of honor. Foundation day



Plantations by Dr ML Madan on the 28th Foundation Day of NBAGR

addresses were delivered by Dr. Madan and Dr. Srivastava emphasizing the holistic and sustainable approach for conservation in AnGR. A presentation was made on Belahi Cattle - a new germplasm from Haryana identified by the



Felicitation of Belahi cattle owner.....

scientists of the bureau. Also a competitive debate for budding scientists was held on the topic "भारतीय परिपेक्ष में पशु अनुवंशिक सम्पदा का संरक्षण एवं संवर्धन". Mr. Rajkumar and Mr. Mamraj, the representative custodians of Belahi cattle, from Panchkulla and YamunaNagar districts of Haryana were felicitated on this occasion. Dr. A. K. Srivastava, presented the prizes to the winners of the debate competition.

RESEARCH PUBLICATIONS

1. Arora R J, Bhatia S, Mishra B P, Jain A and Prakash B (2011). Diversity analysis of sheep breeds from Southern peninsular and Eastern regions of India. *Tropical Animal Health and Production*, 43 (2) : 401-408.
2. Arora R, Bhatia S and Mishra BP (2011) Genetic variation and relationship of six Indian sheep breeds adapted to the northwestern arid zone of Rajasthan. *Biochemical Genetics*, 49 (7-8): 449.
3. Arora R, Bhatia S, Yadav DK and Mishra BP (2011). Current genetic profile of sheep breeds/populations from Northwestern semi arid zone of India. *Livestock Science*, 135:193-198.
4. Ganguly I, Sharma A, Mitra A, Kumar A and Ganguly A (2011). Analysis of Genetic Variations of complete TM4 of Buffalo (*Bubalus bubalis*) Slc11A1 Gene. *Journal of Applied Animal Research*, 39(4):324-327.

5. Kataria R S, Tait RG Jr, Kumar D, Ortega MA, Rodriguez J and Reecy JM (2011). Association of Toll-like receptor 4 single nucleotide polymorphisms with incidence of infectious bovine keratoconjunctivitis (IBK) in cattle. *Immunogenetics*, 63:115–119.
6. Kathiravan P, Goyal S, Kataria RS, Mishra BP, Jayakumar S and Joshi BK (2011). Sequence characterization of S100A8 gene reveals structural differences of protein and transcriptional factor binding sites in water buffalo and yak. *Animal Biotechnology*, 22: 1–9.
7. Kathiravan P, Kataria RS, Mishra BP, Dubey PK, Sadana DK and Joshi B K (2011). Population structure and phylogeography of Toda buffalo in Nilgiris throw light on possible origin of aboriginal Toda tribe of South India. *Journal of Animal Breeding and Genetics*, 128: 295–304.
8. Kumar N, Ganguly I, Singh R, Deb S M, Kumar S and Sharma A (2011). DNA polymorphism in SLC11A1 Gene and its Association with Brucellosis Resistance in Indian zebu (*Bos indicus*) and Crossbred (*Bos indicus* X *Bos taurus*) Cattle. *Asian Australasian Journal of Animal Sciences*, 24 (7): 898-904.
9. L V Singh, Sharma R, Pandey A K, Maitra A, Dixit S P, Tripathi V and Mishra B P (2011) Identification of four novel single nucleotide polymorphisms of CAPN1 gene in Indian goat *Indian Journal of Animal Sciences*. 81(12): 1239-1243
10. Malik Y S, Chakravarti S, Sharma K, Vaid N, Rajak KK, Balamurgan V, Biswas SK, Mondal B, Kataria RS and Singh RK (2011). Genomic analyses of Toll-like receptor 4 and 7 exons of *Bos indicus* from temperate sub-Himalayan region of India. *Asian-Australasian Journal of Animal Sciences*, 24: 1019-1025.
11. Niranjana SK and Vohra V (2011). *Bharat mein kahrgosh anuvansik sansadhan* (in Hindi), Pashudhan Prakash, 2(1): 17-19
12. Raja A, Vignesh AR, AnnMary B, Tirumurugaan KG, Dhinakar Raj G, Kataria RS, Mishra BP, Kumanan K (2011). Sequence analysis of Toll-like receptor genes 1–10 of goat (*Capra hircus*) *Veterinary Immunology and Immunopathology*, 140: 252–258.

13. Tantia M S, Viji R K, Bhasin V, Sikka Poonam, Vij P K, Kataria R S, Mishra B P, Yadav S P, Pandey A K, Sethi R K, Joshi B K, Gupta S C and Pathak K M L (2011). Whole-genome sequence assembly of the water buffalo (*Bubalus bubalis*). *Indian Journal of Animal Sciences*, 81: 465-473.
14. Vohra V, Niranjana SK and Sadana DK (2011). *Bird flu: Murgiyon ki ek mahamari* (in Hindi), Pashudhan Prakash, 2(1): 41-43

Breed Monographs

Spiti Donkey - Monograph #74 (2011) by Rahul Behl, D K Sadana, Jyotsna Behl, P N Attri, Sanjeev Nadda and B.K. Joshi.

Konkan Kanyal, A new germplasm of Maharashtra - Monograph# 75, 2011 by NK Verma, RAK Aggarwal, SP Dixit, VS Kawitkar, PS Dangi, Priyanka Mishra and BK Joshi.

Distinguished Visitors

- A group of 7 ARS scientist probationers of 93rd FOCARS from NAARM, Hyderabad visited on 23.07.2011.
- Dr. K.M.L.Pathak, DDG (AS), ICAR visited on 12.08.2011.
- Dr. K.M. Bujarbaruah, Vice-Chancellor of Assam Agricultural University on 12.08.2011
- Dr. R. K. Sethi, Director CIRB Hisar on 12.08.2011
- Dr. S.K.Dutta, DDG (CS), ICAR visited NBAGR on 09.09.2011.
- Dr. M.L. Madan, Former DDG (AS), ICAR and Dr. V.K. Bhatia, Director, IASRI, New Delhi visited on 25.10.2011.
- A group of 38 students (B.Sc. Biotechnology) from K.V.Pendharkar College, Thane visited on 09.11.2011.
- Dr. Anis S. Das, Managing Director, Kerala Livestock Development Board Ltd., Kerala visited on 01.12.2011.



Distinguished Visitors at NBAGR

Personnel

Retirement : Sh. Jagat Inder Parkash, Administrative Officer retired on 30.11.2011.

Promotions :

1. Sh. Jamer Singh, T-4 promoted to T-5 through assessment w.e.f. 08.01.2011.
2. Sh. Ashok Kumar, T-3 promoted to the post of T-4 from back date i.e. 24.02.2011
3. Sh. Vijay Singh, T-3 promoted to T-4 through assessment w.e.f. 29.06.2011.
4. Sh. Mahavir Singh, T-II-3 promoted to T-4 through assessment w.e.f. 29.06.2011.
5. Sh. Shiv Chander, LDC promoted to Upper Division Clerk w.e.f. 16.12.2011.

Overseas Fellowship/Training/Visits

1. Dr. R.A.K. Aggarwal, Principal Scientist awarded DBT Crest Award for six (6) months at Washington State University, USA w.e.f. 08.08.2011.
2. Dr. D.K. Sadana, Principal Scientist visited Austria to participate in the Summer School on "Animal Breeding meets Social Sciences" held on 26-29th September, 2011 at the BOKU University, Vienna.
3. Dr. Monika Sodhi, Sr. Scientist attended International Conference on "EPS Montreal International Gene Conference" as key Speaker at Montreal, Quebec, Canada from 3-4th November, 2011.

राजभाषा प्रकोष्ठ की मुख्य गतिविधियाँ

1. इस वर्ष सितम्बर माह हिन्दी चेतना मास के रूप में मनाया गया। सितम्बर माह के दौरान संस्थान-स्तरीय प्रतियोगिताएँ आयोजित की गईं जिनमें निबन्ध लेखन, पत्र लेखन, अनुवाद तथा वार्षिक हिन्दी उत्कृष्ट कार्मिक प्रतियोगितायें शामिल रहीं। संस्थान के सभी वर्ग के कार्मिकों ने इसमें बढ़-चढ़कर भाग लिया।



हिन्दी चेतना मास में आयोजित प्रतियोगिता का दृश्य

2. दिनांक 14 सितंबर 2011 को हिन्दी दिवस का आयोजन किया गया जिसमें संस्थान-स्तरीय आशुभाषण प्रतियोगिता करवाई गई।
3. दिनांक 21 सितंबर 2011 को संस्थान के स्थापना दिवस के रूप में मनाया गया। इस अवसर पर सभी विजेताओं को पुरस्कार दिये गये।
4. तिमाही हिन्दी व्याख्यान/कार्यशाला आयोजनों के क्रम में दिनांक 11.11.2011 को दो व्याख्यान आयोजित किये गये जिसमें **आंखों व दांतों की सामान्य बीमारियों के लक्षण व इनकी देखभाल** विषय पर डा. संजय अरोड़ा व डा. कोमुदी अरोड़ा ने महत्वपूर्ण जानकारी दी।
5. दिनांक 11.11.2011 को संस्थान राजभाषा कार्यान्वयन समिति की बैठक की गई, जिसमें कई महत्वपूर्ण मुद्दों पर निर्णय लिया गया।



एन.बी.ए.जी.आर. – एन.बी.ए.जी.आर.

देता है ज्यादा हमको, कम खाकर करे गुजारा ये।

सभी धनो में बड़ा पशुधन, है अनमोल हमारा ये।

एन.बी.ए.जी.आर. का यही मिशन है, फूले-फूले पशुधन का संसार।

सुन्दर नस्लें हैं अपने इन, सभी पालतू पशुओं की।
गुण की ये है खान, यहाँ है सब कुछ इनका उपयोगी॥
लाखों-लाख गरीबों के, जीने का खास सहारा ये।
सभी धनो में बड़ा पशुधन, है अनमोल हमारा ये॥
एन.बी.ए.जी.आर.

भांति-भांति के पशुओं का, भरपूर खजाना हम पे है।
भारत के गाँवों की सचमुच, सुख-समृद्धि इनसे है॥
कुदरत ने उपहार दिया है, हमको बेहद प्यारा ये।
सभी धनो में बड़ा पशुधन, है अनमोल हमारा ये॥
एन.बी.ए.जी.आर.

इस अनमोल सम्पदा को, मिलजुल के हमें बचाना है।
चुन-चुन कर उत्तम नस्लों को, आगे और बढ़ाना है॥
राष्ट्रीय पशु अनुवांशिक, संसाधन ब्यूरो का नारा ये।
सभी धनो में बड़ा पशुधन, है अनमोल हमारा ये॥
एन.बी.ए.जी.आर.

एन.बी.ए.जी.आर. प्रथम तो, नस्लों की पहचान करें।
वैज्ञानिक तकनीक के द्वारा, फिर उनका उत्थान करें॥
एन.बी.ए.जी.आर. है सच्चा, इनका पालनहारा ये।
सभी धनो में बड़ा पशुधन, है अनमोल हमारा ये॥
एन.बी.ए.जी.आर.