

NIANP News & Views

Happy new year
2016



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Ashish Mishra
Atul P Kolte
Anjumoni Mech
Letha Devi G

Director's Desk

Dear Readers,

Adding feathers with number of activities ICAR-NIANP has maintained its own excellence in research and other developmental activities during second half of 2015. Organizing international training programme on "Livestock Methane and Climate Change: Recent Advances in Methane Estimation and Amelioration Strategies" for scientists of SAARC countries and African union, followed by 21 day winter school on "Livestock and Climate Change: Challenges and Ways Ahead for Sustainable Production" and Short course "Recent concepts in Bull Fertility Assessment and Quality Semen Production for Improving Fertility in Farm Animals" for national scientists and academicians of ICAR-NIANP have proved its own potential for scientific aptitude. Successful completion of mid term IRC added value to quality research of the institute. Progress and research of the institute have been appreciated by visit of number of international and national dignitaries during this period. Visit of our scientists to Australia, Japan, Germany etc. has helped to represent ICAR-NIANP globally.

Through Mera Gaon Mera Gaurav and Farmer Fare in different occasions ICAR-NIANP has contributed towards capacity building programme for rural farmer for their progress. Under "Swachh Bharat Mission" regular programme have been organized to keep the campus clean and green by plantation. Organizing fertility camp at Belalkere, Davanagere District, Karnataka and interactive meeting with farmers to improve milk fat percentage and fertility in dairy animals at Muthanallur, Anekal, Tumkur District, Bengaluru have added colours to the activities of the institute for rural development. Apart from the research activities, Institute has celebrated Institute foundation day, Hindi diwas, Ganesh chaturthi, Pongal, Kannada Rajyotsava etc. to build the brotherhood among the staff. During Institute foundation day, retired staff were felicitated to remember their contribution to the progress of the Institute.

I strongly believe that selfless efforts of the ICAR-NIANP team will focus to work for the economic upliftment of farmers by increasing the productivity of animals through quality research and expectation from this prestigious institution will be fulfilled.

Raghavendra Bhatta

Published by

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Research News

Sperm Bio-molecules and Fertility: Newer insights

A declining trend in the fertility in humans and animals is being experienced globally. The causative factors being both internal, like the health status and gamete quality and external, like the environment and the management, the approach to arrest the decline and restore fertility has to be multifaceted. Of late, efforts are being made to gain much insight into the confounding factors like the spermatozoal molecular features influencing the fertility. Here the scope of definition of fertility could stretch much beyond the ability to culminate in successful fertilization and to encompass early embryonic events. For long, it was thought that the sperm contributes only the DNA to the oocyte. However, recent studies suggest that it also delivers RNAs (long RNA, short RNA, small RNA, microRNA, piRNA, tRNA, etc) and proteins for successful fertilization, to support the speculation that sperm bio-molecules might regulate male gamete functional attributes, fertilization events, early embryonic development, pregnancy maintenance and phenotype of the offspring. Recent advances in transcript profiling (Next Generation Sequencing) and protein profiling (LC-MS/MS) have unravelled many of these facts about the sperm biomolecules.

Sperm contains intact as well as biologically degraded RNA that might influence sperm functions to regulate events leading to successful pregnancy. Sperms contain 5000-6000 transcripts and the composition and expression pattern are altered by the diet, environment, stress, etc. Such factors might also induce epigenetic changes in the sperm to eventually affect the fertility and offspring's phenotype and fertility. A recent study made in our laboratory has indicated that the cell free seminal RNA (cfs-RNA) could be of predictive value for semen fertilizing ability and cryo-survivability. Similar to seminal transcripts, the seminal proteins also influence fertility. Seminal plasma proteins have potential fertility regulatory, anti-inflammatory, antimicrobial and immuno- modulatory properties. The seminal proteins might also influence progesterone secretion in female and the female behaviour (post mating, as observed in flies).

During the sperm's perilous journey, these biomolecules prepare it for accomplishing its task,

fertilization. Fertilization is a well orchestrated phenomenon where in, the spermatozoa unlike the oocyte, travels from the site of production in the male, finally to the site of fertilization in the female reproductive tract. The male and female reproductive tracts are rich in microbiome, some of them unfavourable, and the spermatozoa should be equipped to encounter and overcome this obstacle. During its journey from the testis in response to stimulus, the spermatozoa acquire biomolecules that could be immunomodulatory, antimicrobial and anti-inflammatory in nature. These biomolecules enrich the spermatozoa to encounter immune cells in the female reproductive tract to not to elicit immune reaction that is essential for successful journey to reach the site of fertilization. The anti-inflammatory and antimicrobial molecules also prepare the uterus to receive the embryo and submit itself for implantation. Though sperm biomolecules are established to be important for early embryo development, their role on foetal development and phenotype of the offspring is not clearly established. But the results from our laboratory are highly suggestive that the biomolecules might play an important role in maintenance of pregnancy. Reports from other laboratories have indicated the role for sperm biomolecules in phenotype and fertility of the offspring.

With an understanding of the importance of the sperm biomolecules, they can become the tools to assess and also to predict male fertility and cryotolerance of the semen.

Role of sperm biomolecules



Events



Inauguration of ICAR sponsored short course on 14.09.2015



Ayudha pooja celebration on 23.10.2015



Rangoli competition during Independence day celebration on 13.08.2015



Hindi pakwada celebration on 14.09.2015



IMC meeting on 04.08.2015



Kannada Rajyotsava celebration on 09.11.2015



Inauguration of ICAR sponsored winter school on 01.10.2015



FAO (DARE) Meeting held on 26.10.2015



ICAR-NIANP participated in Krishi mela organized by GKVK on 20.11.2015



World Environment day celebration at ICAR-NIANP on 09.10.2015



Inauguration of International training programme on 11.08.2015



NIANP Foundation day celebration on 05.12.2015

Events



Solo song competition of TOLIC
on 16.10.2015



Hindi workshop held on 10.12.2015



Midterm IRC meeting held on 18.11.2015



Independence day celebration
on 15.08.2015



Database refinement meeting
on 15.08.2015

Visitors



Dr Yutaka Uyeno, Asst. professor, Shinshu University
and Dr Makoto Mitsumori, NILGS, Japan visited
ICAR-NIANP on 15.08.2015



KML Pathak, DDG, ICAR visited ICAR-NIANP
on 11.12.2015

Seminar/Lectures/Others

Speaker	Topic
Dr. Sophia Inbaraj Scientist, CIARI	Impact of heat and nutritional stress on immune response in goat
Dr. Manoj Kumar Tripathi Scientist, ICAR-CIRB, Hisar, Haryana	Effects of Tumor necrosis factor α (TNF α) and oxytocin on in vitro prostaglandin production and expression of PGFS and PGES mRNA in buffalo corpus luteum
Dr. Vedamurthy Scientist, ICAR-CSWRI	Granulosa cell estradiol synthesis in Goats
Dr DT Pal Principal Scientist, Animal Nutrition Division	Project file management under PME.

Field workshops



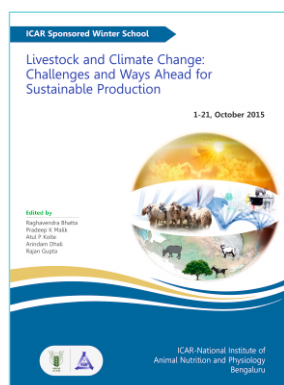
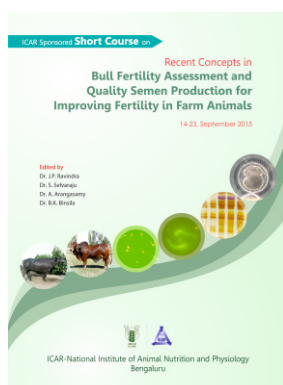
Camp at Davanagere



Interactive meet at Davanagere

- 03.07.2015: Organised fertility camp on, "**Livestock Feed and Reproductive Management**" at Belalkere, Davanagere district, Karnataka. More than 50 dairy farmers participated. The cows were examined for the reproductive problems and farmers were advised with better feeding practices to improve fertility in animals.
- 21.07.2015: Organised interactive meeting with the farmers to improve milk fat percentage and fertility in dairy cows at Muthanallur, Bengaluru Rural district, Karnataka.

Publications



Personnel

Retirement: Shri. S. Athimoolam retired as Administrative Officer on 31-10-2015.

Joining: Shri. Charles Ekka, joined as Senior Administrative Officer on 07-12-2015.

Name	Promoted Post/Grade	Date of promotion
Dr. I.C.G. David, Senior Scientist	Senior Scientist (RGP 9000)	24-09-2012
Dr. P.K. Malik, Senior Scientist	Senior Scientist (RGP 9000)	23-04-2015
Dr. N.M. Soren, Senior Scientist	Senior Scientist (RGP 9000)	22-05-2015
Dr. A. Arangasamy, Senior Scientist	Senior Scientist (RGP 9000)	23-07-2015
Dr. Ashish Mishra, Senior Scientist	Senior Scientist (RGP 9000)	02-08-2015
Dr. Anjumoni Mech, Scientist	Scientist (RGP 7000)	01-01-2009

Awards/ Recognitions



Swaraj Senani

Received the 2nd Prize for **NIANP News & Views**, December 2014
TOLIC Best News Letter in Hindi 2015



N Raghavan

Received the First prize in **Cross word puzzle** competition organized by TOLIC in September, 2015

K Giridhar

Received the Consolation prize in **Quiz and technical article writing** competition organized by TOLIC in September 2015



Anjumoni Mech

Received the Consolation prize in **Solo Singing** Competition organized by TOLIC in September, 2015



Raghavendra Bhatta, Director

Visited university of kassel, witzenhausen, Germany to attend Evaluation Meeting of Indo-German collaborative project during 28-08-2015 to 01-09-2015

PK Malik, Senior Scientist and Atul P Kolte, Scientist

Visited Shinshu University, Japan during December 2015 under Indo-Japan (DST-JSPS) Project Methane mitigation using unexplored phyto-sources in ruminants and their effect on rumen microbial diversity



Laboratory Profile

Radioisotope and Endocrinology Laboratory



Concept

- ✧ Understanding endocrine regulation of productive and reproductive processes in livestock and poultry and strategic interventions to augment them.
- ✧ Development of suitable isotope/nonisotope assay techniques for quantification of hormones and other biological materials.

Approach

- ✧ Profiling hormonal status in different physiological conditions of livestock and poultry.
- ✧ Modulation of endocrine regulatory mechanisms for improving: (a) egg production in poultry through immunological, pharmacological and managemental interventions; (b) functions of corpus luteum and uterus to reduce early embryonic mortality.
- ✧ RNAi technology for modulating hormones for improved production.

Findings

- ✧ Antiprolactin agent, 2- α - bromoergocriptin in feed reduced prolactin levels and enhanced egg production by 2% in commercial layers.
- ✧ Active immunization against prolactin or VIP enhanced egg production by 9% and 12% respectively in dual purpose breed of chicken.
- ✧ Red spectrum light (670nm; LED; 4 watts) accelerated sexual maturity and enhanced egg production by 3% in commercial chicken.
- ✧ Production of prostaglandins shown to be controlled by progesterone, estradiol, oxytocin, LPS, TNF *in vitro*. Linoleic acid, linolenic acid, LPS and TNF- α increased uterine epithelial cell growth *in vitro*.
- ✧ Buffalo FSH, LH and prolactin were isolated and partially purified for development of homologous assays.

Work Contemplated

- ✧ Physiological/environment friendly approaches to modulate productive and reproductive functions.
- ✧ RNAi technique to control prolactin levels for sustained increase in egg production.
- ✧ Genomic regulation of prostaglandin biosynthetic pathways.



*Green Animal Agriculture
Save Our Planet*



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