



ISSGPU NEWSLETTER

Website : <http://www.issgpu.org> e-mail : issgpu@yahoo.com

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Indian Society for Sheep & Goat Production and Utilization

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From the President's desk

Distribution of livestock wealth is more egalitarian compared to land. Hence from the equity and livelihood perspective, it is considered an important component in poverty alleviation programmes. The Indian livestock sector is the endeavor of small holders and is a centuries old tradition and over 70% of rural households depend upon livestock farming for supplementary income. This sector is highly gender sensitive and about 90% of the activities related to care and management of livestock are carried by family's women folk. As a result of gradual transition from subsistence to market system, the economic dimensions of livestock keeping have gained significance.

Sheep and goat contributes nearly to 30% of the meat produced in the country and goats, also have a significant contribution to total milk production (3.52%). India contributed 2.2% of total world's wool production and Rajasthan is the highest contributor (29%) to the wool production of the country. Strategies for meeting demand of quality meat and wool and diversified produce viz., pelt, milk, skin and manure remains the typical challenge for the scientists, technocrats, breeders, farmers and entrepreneurs. Success in sheep and goat development depends on mostly the rural livestock keepers who hold almost the entire population. As wool revenues have declined, producers have turned their attention to lamb and mutton production and the possibility of other by-products e.g. skin/leather. Sheep rearing practice is thus undergoing transformation from extensive to semi-intensive (grazing plus supplementation) and intensive (stall feeding) type that involves high input-high output commercial production system. Again, time of marketing draws attention due to specific religious and social need, which however can be regulated through intervention of reproductive technologies like oestrous synchronization and fixed-time artificial insemination. Our role must therefore is to supplement them with information, knowledge and technologies available in this sector for productivity augmentation. There is need to strengthen and reorient extension services to generate, adapt and transfer appropriate technologies for improved and sustainable production systems in this livestock sector. Sheep and goat enterprises with diversified output in terms of fiber (fine wool, pashmina, carpet wool, hair and fiber), meat and milk besides hides, skin and manure will certainly promise better economic return, profitability and sustainability for the dependent livestock community.

The Society always look for opportunity to convey this important message to all those involved in upliftment of rural economy through this periodic publication. Organization of National Conferences/ Seminars/Workshops, Interactive Meet etc. are some of the important events of ISSGPU to address the challenges in small ruminant and rabbit production, product processing, value addition, marketing and socio-economic issues of the weaker segment of the society, generally involved in this livestock sub-sector.



Jai Hind!

S.M.K. Naqvi



KNOCKDOWN OF MYOSTATIN EXPRESSION BY RNA INTERFERENCE ENHANCES THE MUSCLE GROWTH IN TRANSGENIC SHEEP

Myostatin (MSTN) is known as growth and differentiation factor 8 (GDF8), a negative regulator of skeletal muscle development and growth. MSTN dysfunction/reduction expression therefore offers a strategy for promoting animal growth performance in livestock production. Recently Chinese Scientist (Hu et al., 2013) investigated the possibility of using RNA interference based technology to generate the transgenic sheep with a double-muscle phenotype. A shRNA (short hairpin RNA) expression cassette targeting sheep MSTN was used to generate stable shRNA-expressing fibroblast clones. The fibroblast clones were used to generate the transgenic sheep using somatic cell nuclear transfer (SCNT) technology. Five lambs were developed to term while three live lambs were produced. RNase protection assay showed that the shRNAs targeting MSTN were expressed in muscle tissues of three transgenic sheep. Transgenic sheep showed a tendency to faster increase in the body weight than the control sheep. Histological analysis also showed that myofiber diameter of transgenic sheep M17 was bigger than that of control sheep.

Satish Kumar, Rajiv Kumar, Amar Singh Meena, S.M.K. Naqvi, CSWRI Avikanagar

PARTHENOGENETIC EMBRYO PRODUCTION

Parthenogenetic activation represents a valid tool to mimic the fertilization Ca²⁺ transients and oscillation in nucleus transplantation experiments and to investigate the comparative roles of paternal and maternal genomes in controlling early embryonic development. It is relevant to cloning research, because artificial activation of oocytes is an essential component of nuclear transfer protocols. When a spermatozoon activates an oocyte, it promotes multiple and periodic oscillations of intracellular free calcium. These pulses provoke a cortical reaction, resumption of meiosis, maternal mRNA recruitment, pronuclear development and mitotic cleavage. Although sperm supply the natural stimulus for oocyte activation, oocytes may also be activated parthenogenetically, without any contribution from sperm, by a variety of physical and chemical stimuli. Therefore, artificial activation of oocytes aims to mimic the action of sperm cells during fertilization. Central Institute for Research on Goats came out with an optimized activation protocol of 7% ethanol for 5 min in potassium simplex optimized medium (KSOM) is observed to be the best for artificially parthenogenetic activation for caprine oocytes which may enhance better development of parthenogenetic embryos.

S.D. Kharche, A.K. Goel, S.K. Jindal, B.K. Jha, Puja Goel; C.I.R.G., Makhdoom

INSULIN-LIKE GROWTH FACTOR SYSTEM AND REPRODUCTION IN SMALL RUMINANTS

Increase in the number of live newborn is dependent upon the optimal uterine environment concerted with of optimal physiology mediated by hormones and growth factors. Insulin like Growth Factors (IGFs) are normally expressed in various tissues and reproductive organs. Endocrine IGF-I has been associated with several reproductive traits, such as age at first lambing/kidding, conception rate to first service, twin ovulations, and pre-implantation embryo development and IGF-II is essential for normal placental and fetal growth. They are mitogenic and have endocrine, paracrine and autocrine function infusing cell division, blastocyst formation, implantation and embryo growth. Increase in embryo growth will probably result with a higher implantation rates leading to consequent increases in the number of live offspring. Therefore, studies to determine the effects of modulating systemic and intrinsic IGF-I and IGF-II levels on postnatal ovine uterine development need to be conducted, but could be an effective tool for optimizing postnatal uterine development and perhaps adult uterine capacity and fertility in domestic ruminants.

A. Sahoo, CSWRI, Avikanagar

Announcement

- ❖ **Proceedings of Executive Committee:** Executive committee meeting of Society held on 17.05.2013 at CSWRI, Avikanagar under the chairmanship of Dr S M K Naqvi welcome the elected/nominated members of executive committee. Proposal received from KNP College of Vet. Science Shirval Dist. Shitara, Maharashtra for organising seminar on sheep and goat production in India was discussed and agreed upon to hold the seminar during 2013-14. Proposal for holding one day interactive meet at ARC Bikaner by Dr Sawal (Incharge, ARC-CSWRI, Bikaner) was also discussed and agreed upon. It is suggested to invite the experts in sheep/goat/rabbit/wool production and utilisation for the meet and to pay honorarium/TA to the invited experts. In order to encourage wool and meat industries, sheep and goat farmers, progressive farmers NGO engaged in sheep and goat farming, EC decided to introduce award for these categories. An award for best oral paper presentation in the seminar similar to poster presentation for their significant contribution for sheep, goat, angora and wool processing also introduced.
- ❖ National Seminar on "Sheep and goat biodiversity and breeding policies-issues and perspectives" will be organized by Indian Society for Sheep and Goat Production and Utilization will be on 21-22 February, 2014 at Krantisinh Nana Patil College of Veterinary Science, Shirwal-412801, Dist-Satara (Maharashtra Animal & Fishery Sciences University, Nagpur) Maharashtra. For detail kindly contact Dr H.S. Birade, Professor & Head, ARGO and Organising Secretary or visit our website: www.issgpu.org
- ❖ Applications are invited for ISSGPU Fellow from life members of ISSGPU who has contributed significantly to society and dedicated his/her life for sheep and goat welfare activities such as research, development and extension. Application should be reached to Secretary, ISSGPU Avikanagar before 31 Jan 2013 by post / Email: dbshakya_67@yahoo.co.in.
- ❖ ISSGPU is creating directory for Email of the life members of the society. All are requested to kindly send his/her Email id to Secretary, ISSGPU, Avikanagar through Email: dbshakya_67@yahoo.co.in.



NUTRITION-REPRODUCTION INTERACTION

Ability to adapt variable climatic and topographic environments and survival and sustenance during periods of nutritional deficiency has got a significant bearing on productive life-span and per animal output of any livestock rearing system. Nutritional deprivation seems to affect ovarian follicular growth via a LH-independent mechanism, probably involving intra-ovarian growth factors, when the level of nutrition falls below a critical threshold. Short-term energy supply termed as "flushing" around conception enhances follicle recruitment and follicle growth and thus can improve ovulation rate and litter size in small ruminants. Potential sites of action of nutrition on ovarian function include systemic effects at the hypothalamic level via GnRH synthesis and release; the anterior pituitary through control of synthesis and release of FSH, LH, and GH; at the ovarian level through regulation of follicle growth and steroid synthesis. There are also possible local sites of action via effects on the cascade of growth factors and their binding proteins within the ovary. Metabolic processes involved in maintenance of energy balance and reproductive processes have got influence on the hypothalamic-pituitary-gonadal (HPG) axis. Metabolic status impacts reproductive function at systemic level, modulating the hypothalamic GnRH neuronal network and/or the pituitary gonadotropin secretion through several hormones and neuropeptides, and at the ovarian level, acting through the regulation of follicle growth and steroidogenesis by means of the growth hormone-IGF-insulin system and local ovarian mediators.

Nutrition and individual body condition vary widely within a flock and between seasons of the year, affecting both separately and co-jointly reproduction in small ruminants. Circulating levels of nutrients and metabolites are related to a physiologically relevant combination of factors including nutrient reserves, nutrient intakes and nutrient demands for maintenance, growth, or production. On the other hand, maternal undernutrition and overnutrition or supplementation that seems to have impact on components of the HPG system of offspring could be linked affecting next generations. Every likely, this may have important implications for the feeding strategies adapted for prolific ewes during late-pregnancy and early postpartum periods when feed intake is often physiologically restricted. Therefore, short-term nutritional supplementation or targeted nutrition on follicle development, in-utero nutrition for the foetus, and pre and postnatal nutrition of prolific ewes has got substantial bearing on reducing empty-days and enhancing reproductive life of sheep.

A. Sahoo, Kalyan De, CSWRI, Avikanagar

DIFFERENCE BETWEEN ANIMAL HAIR AND HUMAN HAIR

Pattern of pigmentation: The pattern of the pigmentation can vary widely in different animals. While the pigmentation in

human hair tends to be denser toward the cuticle, in animals it is denser toward the medulla. Animal pigments are often found in solid masses called ovoid bodies, especially in dogs and cattle. Human hairs are usually one color along the length. Animal hairs can change color abruptly in a banded pattern.

Medullary Index: In animals, the medulla is much larger than it is in humans. The ratio of the diameter of the medulla to the diameter of the entire hair is known as the medullary index. If the medullary index is 0.5 or greater, the hair came from an animal. If the medullary index is 0.33 or less, the hair is from a human.

Cuticle type: The cuticle of the hair shaft can also help distinguish human hair from animal hair. There are different type's cuticles in different mammal hair cuticles. Rodents and bats have a coronal cuticle with scales that give the appearance of a stack of crowns. Cats, seals, and mink have scales that are called spinous and resemble petals. Human hair has cuticle scales that are flattened and narrow, also called imbricate.

Usage: Hair and fur are chemically indistinguishable, having the same chemical composition, and are made of keratin. The primary difference between hair and fur is the word usage. The hair of non-human mammals refers as "fur," while humans are said to have hair. So, basically, hair is a characteristic of all mammals. Fur is a reference to the hair of animals. But there are a few exceptions: when an animal has very coarse or sparse fur, as in the case of a pig or elephant, we usually call it hair.

Researchers at Washington University School of Medicine in St. Louis argue that hair on the head is somehow different from fur because fur stops growing when it reaches a certain length, but our head hair continues to grow. The ordinary definition of fur is related to the density of the hair, and sometimes its softness, rather than growth pattern.

Hair follicle: It is one of the key differences between human and animal hair. In case of animals, the core allows for the coating of hair to provide excellent insulation from not only heat and cold, but also a fair amount of protection from rain as well. Along with these thermal regulating qualities, coarse nature of animal hair works as a great means of holding in cold or heat, as well as preventing rain and moisture. In contrast, human hair lacks this ability and does nothing to provide temperature regulation for the body.

Growth Pattern: In humans, the strands of hair tend to grow independently, while for animals' hair growth tends to be more synchronized depending on the weather condition. While human hair has to be cut according to one's preference, animal hair grows to a certain point and then simply fall out, to be replaced by new hair when and as the time is right.

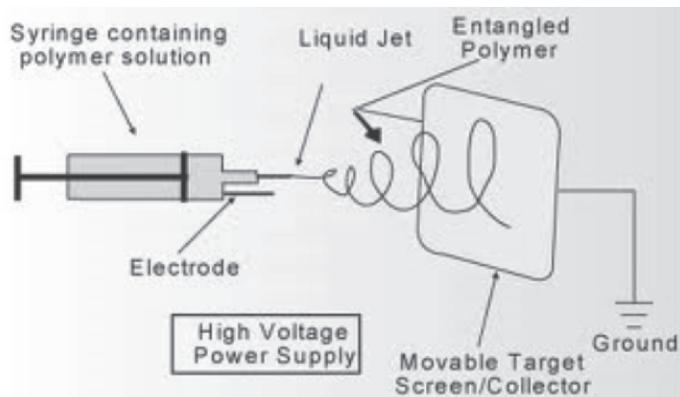
Composition: Another noticeable difference between human and animal hair is the composition. Human hair generally has the same

texture, while animal hair tends to include a double composition. The diameter of human hair ranges from 17 to 181 μm while fur is much thicker than the human hair.

Vinod Kadam, Pawan Pareek, Ajay Kumar, D.B. Shakyawar, CSWRI, Avikanagar

Electro-spinning technique for nano-fibre preparation

Electro-spinning is a term used to describe a class of fiber forming processes in which electrostatic forces are employed to control the production of fibers. A basic electro-spinning apparatus consists of three elements: an electrical generator (high voltage supply), a metallic capillary and a grounded collector. The polymer in solution passes through the capillary connected with the generator, elongates in the form of a continuous filament within the electrostatic field, solidifies by the rapid solvent evaporation and finally deposits on the collector surface.



Schematic of electro-spinning process set up

When an electric field is applied between a needle capillary end and a collector, surface charge is induced on a polymer fluid deforming a spherical pendant droplet to a conical shape. As the electric field surpasses a threshold value where electrostatic repulsion force of surface charges overcome surface tension, the charged fluid jet is ejected from the tip of the Taylor cone and the charge density on the jet interacts with the external field to produce instability. High surface charge densities enhance a whipping mode rather than axis symmetric mode, where bending of the jet produces highly stretched polymeric fiber with simultaneous rapid evaporation of the solvent.

The important process parameters in electro-spinning are applied voltage, working distance between tip and collector, flow-rate of solution and tip diameter. The spinning is also depends on the properties of the polymer solution (polymer molecular weight, concentration, viscosity, electrical conductivity, superficial tension and vapor tension of the solvent) and environmental parameters such as temperature, humidity, ventilation, and pressure.

The electro-spinning has been recognized as an efficient method for the fabrication of submicron-sized fibers and various macromolecules have been electro-spun into ultrafine fibers as thin as several nanometers. Then nano-scale fibrous structures have a number of modern science applications due to their amazing characteristics such as very large surface area-to-volume ratio and high porosity with very small pore size. Therefore, nano-fibers can be promising materials for many biomedical applications such as tissue templates, medical prostheses, artificial organ, wound dressing, drug delivery, and pharmaceutical composition. The electro spun materials are of interest for many applications ranging from filtration systems, textile and composite reinforcement to sensors and biomedical devices and materials for tissue-engineering.

Vinod Kadam and D.B. Shakyawar, CSWRI Avikanagar

LAMB 'GET UP AND GO'



Lamb mortality averages 15% of lambs born across all sheep producing countries, although the mortality on some farms may be much higher. Ewe management can improve lamb survival but, despite much research in this area, lamb mortality has proved to be a difficult figure to reduce. This constrains profitable, sustainable and high welfare sheep production. An increase in lamb survival of 3% a year would increase productivity by nearly a million lambs, adding to the economy and reducing by more than half a million the number of ewes required to produce an equivalent quantity of lamb.

Behavioral traits that are important for lamb survival, such as lamb '**get up and go**', can be measured using scores based on lamb behavior, which are under genetic control. So farmers will now have the option to select rams for better lamb survivability, based on improved lamb vigour.

Source:http://www.sruc.ac.uk/info/120464/research_impact/957/lamb_get_up_and_go



DEGRADED AND WASTELANDS OF INDIA: STATUS AND SPATIAL DISTRIBUTION

Water erosion is the most predominant degradation class affecting large number of states. Uttar Pradesh is the worst affected state, covering 54% of the total geographical area (TGA), followed by Madhya Pradesh, Karnataka, Jharkhand, Arunachal Pradesh and Meghalaya, covering 44%, 41%, 40%, 32% and 31% of the TGA. The second major degradation class is soil acidity, particularly in soils having pH <5.5. Nagaland with 91% of TGA, ranks first among states affected with soil acidity, followed by Manipur (72%). The other states following in order are Tripura, Kerala, Mizoram, Meghalaya, Goa, Assam, Arunachal Pradesh and Chhattisgarh. Soil salinity is another major degradation class affecting mainly coastal states. Salinity is highest in Andaman and Nicobar islands, covering 9% of TGA, followed by Gujarat (8%) and West Bengal (5%). Orissa, Rajasthan, Maharashtra and Haryana each has 1% affected area. Finally, soil sodicity that affect both physical and nutritional characteristics of the lands and ultimately rendering them partially or fully non-productive, the problem is very intensive in Uttar Pradesh, affecting 6% of the TGA followed by Haryana (4%) and Punjab, Gujarat and Tamil Nadu (3% each).

Management of land resources, in general, and potentially culturable lands in particular, encompasses, crop production methods that will keep pace with country's food needs, sustaining environment, blunting impacts of climate change, preserving and enhancing natural resources, and supporting livelihood of farmers and rural population in the country. Thus, there is a pressing need for enlarging area under arable lands, by the way of reclaiming degraded lands for sustainable intensification of agriculture, in which crop yields can be increased without compromising and yielding to adverse environmental impacts and without reducing area under forests.

Source: www.icar.org.in/files/Degraded-and-Wastelands.pdf

KANGAROO GUT MICROBIOTA MAY MAKE CATTLE FARMING GREENER

Kangaroos, and marsupials in general, produce much less methane in their burps, flatus and manure than farm animals such as cattle. Scientists from Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) have identified a specific bacterium within the gut of the Tammar Wallaby that is able to digest their food without making as much methane. Typically, the Tammar Wallaby produces one fifth less methane per unit of food digested than cattle. The bacterium responsible is a newly discovered strain of the Succinivibrionaceae genus which was grown on a specially designed culture to resemble the conditions of the wallaby's gut. During fermentation the bacteria did not



produce methane but a compound of carbon, hydrogen and oxygen known as succinate. As well as producing far less methane the bacterium is far more efficient in processing food, extracting more nutrition from plant material.

Members of the Succinivibrionaceae genus are found naturally in the guts of many plant-eating animals, including cattle, but are not found to dominate the digestive functions as they do in marsupials. Scientists hope that they can manipulate the microflora of cattle so as to make the Succinivibrionaceae more effective within cattle. Lead researcher, Mark Morrison of CSIRO explains, "Our long-term goal is to redirect feed digestion in livestock away from methane formation, and instead produce more end products that are nutritious for the animal. By doing so, we should have a positive impact on animal productivity and the environment."

Source: <http://www.optibacprobiotics.co.uk/blog/2011/06/kangaroo-gut-microbiota-may-make-cattle-farming-greener.html>

ENVIRONMENTAL IMPORTANCE OF NUTRITIONAL STRATEGIES

Adopting nutritional strategies to minimize the environmental impact of livestock production will be most effective when the variation in nutrient content, as well as the biological availability of nutrients from individual feed ingredients, is taken into account. Livestock and poultry are raised because of their ability to convert mainly plant materials (grains and forages) into consumable commodities such as eggs, meat and milk. The conversion process is not, nor is it feasible or realistic to expect it to be, 100% efficient. Nutrients contained within the plant materials that are consumed, but not utilized by the animals for maintenance and production, are excreted in the manure. In order for livestock production to be not only environmentally sustainable but also economically sustainable, the livestock/feed industry must be able to recycle the flow of all feed nutrients, but



particularly nitrogen and phosphorus from animal manure back to the soil where they can again be used for crop production. In fact, there is an expectation from the broader public than anything less than this should not be considered an acceptable farm practise. The challenge then, for the livestock producer and the animal nutritionist is to accurately determine for each feed ingredient; its nutrient content, the bioavailability of those nutrients to the animal and the factors that affect the bioavailability of the nutrients contained within individual feed ingredients. Once this information is known, the amount of supplemental nutrients can be carefully adjusted to balance the diet to optimize animal performance and potentially reduce the amount of nutrient excretion that needs to be managed for crop production.

A. Sahoo, and R.S. Bhatt, CSWRI, Avikanagar

NITROUS OXIDE - THE FORGOTTEN GREENHOUSE GAS?

Nitrous oxide (N_2O) is a powerful atmospheric greenhouse gas and cause of ozone-layer depletion. Global emissions continue to rise; more than two thirds of these emissions arise from bacterial and fungal denitrification and nitrification processes in soils, largely as a result of the application of nitrogenous fertilizers. Many soil bacterial use nitrate to support respiration, especially after the application of nitrogen fertilizer, leading to production of the potent and long lived greenhouse gas nitrous oxide (N_2O). Human activities have more than doubled the annual input of reactive N to the biosphere compared with prehistoric rates. This anthropogenic reactive N is primarily fertilizer N, biologically fixed N (in legume crops) and NOx from combustion. While these forgotten gases account for only a small fraction of total greenhouse gas emissions from deforestation, nitrous oxide is up to 300 times more effective at trapping heat in the atmosphere when compared to carbon dioxide over a 100-year time period and methane, in comparison, is 25 times more effective.

Mitigation measures through the use of nitrification inhibitors has been demonstrated. Ongoing soil acidification of agricultural soils by intensification of agriculture and excessive use of N-fertilizers may enhance the N_2O emissions and therefore it is logical that careful adjustment of pH in agricultural soils will reduce N_2O emissions from slightly acidic soils.

Source: <http://www.nitrousoxide.org/docs/TB1593.pdf>

FAT TAIL AND RUMP SHEEP (DUMBA)

Dumba sheep is not indigenous and exact source of origin of these animals is not known. Main objective of rearing and keeping these animals by entrepreneur or live animal traders is to fetch a huge sum of money during the Eid festival as they have great aesthetic and religious value. Elite people spend huge money on purchasing these animals. The market price of these animals in Mumbai and



other metropolitan cities is very high as claimed by entrepreneurs. Adult males are sold at the rate of Rs90000 to 150000, female Rs70000 and lambs Rs15000-30000 in the market.

Four different genetic groups based on distribution of the fat in rump, tail or both are found in the region.

1. Fat rump sheep group I: Good deposition of fat on rump and no evident tail.
2. Fat rump sheep group II: Little different phenotypic confirmation from group I.
3. Fat tailed sheep without fat rump: Developed from the crosses of exotic fat rump sheep with native sheep, also called as Nagori Dumba, they do possess fat tail
4. Fat tail as well as fat rump. Fat rump male and female weigh 92.50 kg and 65.67 kg with rump circumference of 39.75 and 28.60 inches at 12 month of age.

Source: Division of Animal Genetics and Breeding, CSWRI, Avikanagar

BLACK BROWN: A PROMISING BROILER RABBIT STRAIN



Black Brown strain developed at CSWRI Avikanagar has high prolificacy. Litter size at birth (LSB) of 12 and litter weight at birth (LWB) of 600 g has been recently achieved. This achievement is



more remarkable as it has been achieved during summer, which is a stressful period for broiler rabbits in the semi-arid region, which showed its adaptability over the years and thus can be reared successfully in these regions. The adaptability, in addition to high prolificacy is also being reflected in high survivability, high growth rate and early sexual maturity. Earlier, record body weight of 2.835kg at 12 weeks and siring of 19 kits before attaining adult age by B-2309 has continued to sire 9 kits through doe No B-2041, which had given birth to 11 kits earlier. In addition, highest milk yield of 5760g in 28 day lactation period and highest litter weight at weaning (28 days) of 5294g were recorded in this strain. Thus, the Black Brown rabbit is developing into a promising broiler rabbit strain which is not only prolific and fast growing but is also well suited for rearing in most parts of the country.

Source: Rabbit Unit, CSWRI, Avikanagar

NEWS AND INFORMATIONS

- * केन्द्रीय गृह मंत्रालय भारत सरकार के आधीन कार्यरत नगर राजभाषा कार्यान्वयन समिति (नराकास), मथुरा द्वारा वर्ष 2012–23 के दौरान राजभाषा हिन्दी में उत्कृष्ट कार्य हेतु संस्थान निदेशक डॉ. सुधीर कुमार अग्रवाल को दिनांक 25–07–2013 को प्रथम पुरस्कार के रूप में चलवैज्ञनी शील्ड व प्रशस्ति पत्र प्रदान कर सम्मानित किया गया।
- * **Dr. V. Sejian bags ICAR Lal Bahadur Shastri Outstanding Young Scientist Award**

Dr Veerasamy Sejian, Senior Scientist at National Institute of Animal Nutrition and Physiology, Bangalore under the aegies of ICAR was awarded the Lal Bahadur Shastri Outstanding Young Scientist Award for his contribution in the area of climate change and its impact on livestock production. The award was conferred by the Honorable Minister of Agriculture Shri. Sharad Pawar on the occasion of 85th foundation day of ICAR on 16th July 2013. Dr Sejian worked on environmental stresses impact on sheep production. His work on the concept of multiple stresses impacting sheep production and reproduction had given him worldwide recognition which was reflected in his sound international and national publications of repute. He also edited a book entitled "Environmental stress and Amelioration in Livestock production" for Springer Publisher, USA which has also been widely followed for improving livestock production under the changing climatic scenario.

- * Prof. K.M.L Pathak DDG (AS) ICAR, visited CIRG Makhdoom on 19.11.2013. He visited livestock farms viz. Barbari, Jamunapari, Sheep unit, Jakhrana and Agriculture farm of the institute and addressed to scientists, technical, and administrative officers of the Institute.
- * A team of five Afghanistan scientist visited to CSWRI on 11.11.13 on the occasion of study tour. In the interaction

meeting, Director Dr S.M.K. Naqvi deliberated on various research activities of the institute and expressed hope that the international association will grow further with exchange of ideas and research collaboration. The team visited to various livestock sectors, experimental units, research laboratories and wool plant of the institute.

- * Sh. Alok Kumar Jain, IAS & VC GB Pant University of Agriculture & Technology, Pant Nagar visited the Institute on 29.11.2013. He addressed to trainees, scientists on the occasion of National Training Programm on 56th Scientific Goat Farming held during 21-29 Nov. 2013.
- * CIRG supplies record number (676) of superior germplasms (male & female goats and sheep) in 2011-12 to individual farmers, State Governments and other agencies for genetic conservation and improvement.



First time Honorable Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR, New Delhi visited NTRS, Garsa



Low-cost shelter model for goats



Training on Angora Rabbit Production & Management at NTRS Garsa for progressive farmers from Sikkim



National training program on 'Scientific Goat Rearing'
at CIRG, Makhdoom



Honorable Dr. K.S. Rao, Minister of Textiles, Government of
India visited North Temperate Regional Station (CSWRI), Garsa



D.D.G.(AS), Prof. K.M.L. Pathak's visit to ARC,
CSWRI, Bikaner



LAL BAHADUR SHASTRI OUTSTANDING YOUNG SCIENTIST
AWARD 2012 of ICAR was conferred to Dr V. Sejian, Sr Scientist



Inauguration of training program on
woollen handicrafts product development



Health camp and off campus training on balanced feed preparation
organized under Magra field Project (NWPSI) at ARC, CSWRI, Bikaner



Executive Director, Central Wool Development Board, Er K K Goyal visited CSWRI



Off campus training program for technical staff from July 2nd- 6th 2013

**BIBLIOGRAPHIC DATABASES OF CABI INDEXING
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CAB Abstracts, Global Health, Index Veterinarius, AgBiotech News and Information, AgBiotechNet, Animal Science Database, Environmental Impact, Forest Science Database, Nutrition and Food Sciences Database, VetMed Resource, Agricultural Economics Database, Agroforestry Abstracts, Animal Breeding Abstracts, Forest Products Abstracts, Forestry Abstracts, Grasslands and Forage Abstracts, Helminthological Abstracts, Nutrition Abstracts and Reviews Series A: Human and Experimental, Nutrition Abstracts and Reviews Series B: Livestock Feeds and Feeding, Parasitology Database, Protozoological Abstracts, Review of Medical and Veterinary Entomology, Review of Medical and Veterinary Mycology, Rural Development Abstracts, Tropag & Rural, Veterinary Bulletin, Veterinary Science Database, World Agricultural Economics and Rural Sociology Abstracts.

A. Sahoo, M.L. Jangid and C.P. Swarnkar, CSWRI, Avikanagar

Request to all life members

- Kindly contribute to ISSGPU Newsletter about latest discoveries, news on sheep, goat and rabbit.
- Kindly send your updates on phone number, e-mail and address to the secretary ISSGPU (sahooarta@yahoo.com).
- Please visit our website for latest informations (www.issgpu.org)

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