



CIRG news



केन्द्रीय बकरी अनुसंधान संस्थान
Central Institute for Research on Goats



Straight talk....



Central Institute for Research on Goats, over last three decades, has carved a niche for itself as a pioneer research institution and has been nourishing the country with the technical and intellectual resources for the livelihood security of poorest of the poor of the country. The institute has always strived to cater the needs of goat farmers. As it is well said by our Director General, Dr. S Ayappan that "Goat has a great future in changing livestock scenario". The global economic and business environment is undergoing a rapid change that will have far reaching impact and implications on agriculture production in India including goat sector. The poor man's cow-goat has tremendous potential to be projected as the 'Future Animal' for rural prosperity under the changing agro-geo-climatic conditions and depleting resources. It is estimated that global food demand is expected to be doubled by next couple of decades, while production

environment and natural resources are continuously shrinking and deteriorating. Goat possesses distinct social and biological advantage and have been poor people's most reliable source of livelihood and nutritional security. Goat can sustain on vivid variety of vegetation in different agro-climatic conditions. Therefore, conservation of goat natural resources, maintenance of biological wealth and acceleration of goat industry are considered of paramount importance in the present context as well as of the future. Day by day, technological challenges are becoming more complex as demand for food specially meat products is increasing and supply sources are dwindling. Incidentally, the science is also changing rapidly with the emergence of new tools, methods, techniques and approaches that promise technological breakthroughs to accomplish our mission. In global scenario, India ranks first in terms of goat population, milk production and second in meat production. The chevon is one of the most widely preferred and consumed meat in India. Goat milk is also gaining importance due to its health promoting traits. Goat provides future hope for better livelihood and income for more and more people living in agro-geo-climatic disadvantageous areas. The research initiatives taken by the institute have led to notable accomplishments in conservation of native goat breeds under natural resource management, efficiency in use of inputs, climate resilience, goat rearing as secondary agriculture and economic transformation of farmers through

Editorial Board - Chief Editor : Dr. V. K. Gupta, Editors : Dr. N. Ramachandran, Dr. Souvik Paul

goat based technological interventions. Goat farmers and financial institutions have to move together to seek suitable local partnerships for investments in the areas of goat breeding, feed and fodder production and marketing of milk and value added products. The institute can facilitate such a transformation.

The institute envisages that innovations and reinforcement of research on goat production

would lead to nutritional security thus prosperity of the millions of poor, landless and marginal farmers of the country. Chief Editor of "Goat News" along with other team members deserve appreciation for bringing out this important publication of the institute.



S. K. Agarwal
Director

Body Condition Scoring (BCS) in Goats - A step forward to Commercial Goat Farming

The capability of farmers to assess the body condition of their goats easily and rapidly is of utmost importance especially in commercial goat farming. Judging the body condition on a regular basis, irrespective of number of animals in the flock is considered as a desirable managerial skill. BCS enables the farmer to evaluate the progress of the flock in terms of productivity and is essentially a directory of the amount of muscles and the degree of fatness in the animal. BCS is used for determining feed requirements, judging the health status of individual animals, establishing the condition of animals during routine animal management and are also for assessment of issues related to animal welfare.

Body condition scoring should be approached in an organized mode. Systems have been developed which employs an index of either 1 to 9, or 1 to 5. In each case, a score of 1 is used to describe animals that are extremely emaciated and cachectic and the maximum score of 5 or 9 describes animals that are fat or obese.

Farmers should be concerned with the body conditions of both male and females. A good body condition can make a significant difference and

results in higher levels of reproduction. Does that are too obese may not be able to breed, does that are too thin may experience low twinning rates, lower weaning weights and general reproductive failures. The best way to prevent over or under conditioned, breeding animals should be checked for BCS on a regular basis as a means of monitoring the overall health of the flock, and identifying 'at risk' animals. Different breeds of goat, and those reared under different climatic and husbandry conditions are expected to have different standard criteria for assessment of condition. The BCS index may also be influenced by the primary farming intentions - meat and milk type goats. Supplementary feeding can be adjusted up or down by using the body condition scores. However, farmers should take care to make any feeding adjustments gradually. Since, goat is a ruminant, sudden change in the diet can greatly affect the rumen organisms, and may result in health problems such as diarrhoea.

BCS is a fairly simple concept. With practice, a farmer can become proficient in scoring does and bucks throughout the year for efficient farming and marketing.

<http://www.ans.iastate.edu/faculty/morrison/acc/GoatResearch.pdf>

http://www.ansci.cornell.edu/goats/CSGSymposium/bodycondscore_goat.pdf

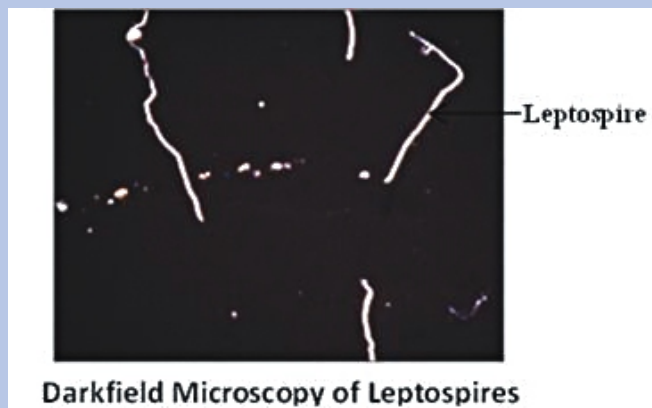
<Http://www.esgip.org/PDF/Technical%20Bulletin%20No.%208.pdf>

Souvik Paul, Shivsharanappa N., Nitika Sharma, A. K. Mishra

Leptospirosis in Goats

Leptospirosis is a contagious and zoonotic disease caused by the bacteria of the genus *Leptospira*, and affects humans as well as animals including goats. *Leptospira* is a spirochaete of the family Leptospiraceae, motile, aerobic, flexuous, helically coiled bacterium ranging from 6-20 μ in length. There are two species of the genus *Leptospira* namely *Leptospira interrogans* (*L. interrogans*) and *L. biflexa*. *L. interrogans* is a pathogenic species whereas, *L. biflexa* is saprophytic. *L. interrogans* has many serovars capable of causing illness. Various serovars of *L. interrogans* have been isolated from the leptospirosis in goats, most notably *L. pomona*, *L. grippotyphosa*, *L. icterohemorrhagiae* and *L. serjoe*. *Leptospira* most commonly gains entry through penetration of wet skin or mucus membranes of the host. Goats may also get infection by the ingestion of feed and water contaminated with urine from the infected animals. Warm, moist and wet conditions favour the growth of the organisms. The bacteria can survive in the standing water for long periods. Infection causes bacteremia and septicemia and then subsequent localization of the organisms in the kidney leading to leptospiruria. Transplacental migration of bacteria may cause abortion in second half of pregnancy. Fever (104-106°F), anorexia, depression, tachycardia, icterus of mucus membrane, petechial hemorrhages on the conjunctiva and reddish brown urine are the main clinical signs observed in the disease. In acute leptospirosis, the affected animals without treatment may die within 2-3 days.

The organism can be isolated from blood, kidney and urine. The most practical method for diagnosis of the disease is the assessment of antibody titers in acute and convalescent serum samples taken seven to ten days apart in clinically affected goats. The microscopic agglutination test (MAT) is most frequently used for assessing the antibody titers. This test measures both IgM and IgG antibody, and is mainly useful for the diagnosis of acute



leptospirosis than its chronic form. A titer of 1:300 or more is considered positive for the acute form. A combination of streptomycin and penicillin has been found very effective in treating caprine leptospirosis. A single intramuscular injection of 25 mg/kg of streptomycin may clear the bacteria from the kidney. In place of streptomycin, a single intramuscular injection of long acting oxytetracycline @ 20 mg/kg BW may be tried. Fluid therapy is recommended to maintain water and electrolyte balance, and blood transfusions should be applied in case of the acute anemia. Rodent control, removal of standing water/damp bedding, quarantine, vaccination and screening or prophylactic treatment of newly purchased animals for elimination of the carrier state are the steps to be followed to prevent the disease occurrence. New born kids must be fed colostrum within 1/2 hour of birth for acquiring passive immunity. Little or no protective cross immunity occurs among the various serovars of *L. interrogans*, so multivalent vaccines should be used. Kids older than three months of age should be vaccinated, and revaccination at 6 month interval is recommended. Farmers, Livestock keepers, Veterinarians, Milkers and Slaughterhouse workers are prone to get infections due to their occupations, so they should be very conscious while handling the infected goats/goat-carcasses.

Photo: <http://openi.nlm.nih.gov/>

A. K. Mishra, Nitika Sharma, Shivasharanappa N. and Souvik Paul

Goats in Indian Mythology

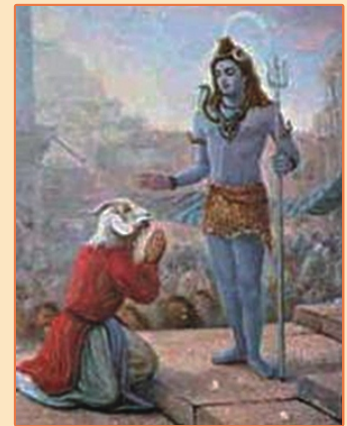


Animals have a special place in Indian mythology. Goat finds mention in Puranas and Vedas. Goat is mentioned both as a symbol and as a vehicle/vahanas of Gods in Hindu scriptures. Vâhana denotes the vehicle of devtas and is often called as the deity's mount. The vehicle of Goddess Kali is a black goat. Goats are also sacrificed to Goddess Kali and other village deities.

In the Samkhya system of Hinduism, Prakriti is depicted as a female goat. Prakriti represents the Mother Nature. The color of goat is red, black or white and they represent the three gunas – Sattva, Rajas, and Tamas. It is mentioned that the seed which fell from Prajapati transformed into a male-goat. Goat is also mentioned in Tantric texts both as an animal and as a symbol.

Sati, immolated herself because she was unable to bear her father Daksha's humiliation of her husband Shiva. Enraged Shiva beheads Daksha, after the self-immolation of Sati. Wife of Daksha, Prasuti, prayed to Lord Shiva for her husband's life. Later, repentant Shiva breathes life into Daksha by replacing his head with that of a goat, when Daksha's head could not be found.

www.hindu-blog.com/2010/.../virabhadra-shiva-gana-hindu-god.html
<http://www.hindu-blog.com/2008/01/goat-in-hindu-mythology.html>
[Http://www.webonautics.com/mythology/kartikeya11.html](http://www.webonautics.com/mythology/kartikeya11.html)



Nitika Sharma, Shivsharanappa N. and A. K. Mishra

Development of Parthenote in Goats – First Report

Success Story

Scientists of CIRG, Makhdoom have been able develop parthenote up to 34 days in utero for the first time under a World Bank Assisted NAIP on "Developmental Potency of Parthenogenetic Goat Embryos". The project is aimed at investigating the developmental potency of parthenogenetic embryos (embryos produced without the involvement of male) following transfer in to surrogate mother. Goat oocytes used in this technique were collected from the follicles of ovaries brought from an abattoir located at Agra. Recovered oocytes were subsequently cultured in a special defined medium in a CO₂ incubator.

Matured oocytes were then chemically activated to start cleavage and the presumptive zygotes were then cultured in mCR2aa medium for 4-5 days. The embryos at 8-16 cell stage and morula stage were transferred into surrogate goat of Sirohi breed through surgical technique. Following transfer, pregnancy was initially confirmed at day 30. Subsequently the embryo could develop up to 34 days in utero. On 16th November 2012, this surrogate goat aborted the parthenote after 34 days of pregnancy. Micro-satellite and amelogenin gene analysis confirmed its identity as parthenogenetic fetus.



USG of Parthenote at day 30



Aborted Parthenote fetus

S.D. Kharche, A.K. Goel and S.K. Jindal

Efficient Utilization of Goat Slaughter by-product: Blood

Blood is the first by-product obtained after slaughter but is commonly discarded or not fully utilized. Average yield of blood after slaughter of food animal is nearly 3 to 3.5% of its live body weight. It contains approximately 60% of the total potential protein available from by-products. The way in which blood is utilized depends upon animal health and collection procedure. In European and Asian countries, hygienically collected blood has long been used as a source of human food for the preparation of delicious cuisines like blood puddings, blood sausages, blood soups, breads and crackers. However, major part of the blood particularly in developing countries like India is still thrown away in the drainage. This result in loss of nutrients, economy in addition to causing severe environmental pollution due to high biological oxygen demand (BOD5). Its high nutritional value, coupled with serious disposal issues, has fuelled recent research and industrial efforts to incorporate blood and its products into a wide range of food products. Blood is usually limited to the tune of 0.5 to 2% in sausage products where it enhances colour, but above this level, it has a negative effect on sensory properties particularly colour and flavour. Blood which gets contaminated during slaughter process or obtained

from unhealthy food animals finds its way for the preparation of fertilizer or blood meal which can be given as a protein supplement to mono-gastric domestic animals like pig and poultry. Blood meal contains almost 80% protein which is a rich source of amino acid-lysine. In case of goat, blood as a slaughter by-product either dumped as a waste or used for the preparation of fertilizer and in rural areas, it may be used for the preparation of traditional products. Average yield of blood in goat breeds maintained at CIRG, Makhdoom is 3.8 to 5.0 % of the body weight. In the Goat Products Technology Laboratory, an attempt has been made to utilize the goat blood at 1.5% and 3% levels for the preparation of goat meat nuggets and determined different quality parameters.

Another popular product based on blood is 'blood pudding'/'black pudding' is an english term for sausage made by cooking blood with a filler until it is thick enough to congeal when cooled. It is also called 'blood sausage' (in German, Blutwurst) which is also a useful term for similar blood - based solid foods around the world. Pig or cattle blood is most often used; sheep and goat blood is used to a lesser extent. Blood from poultry, horses, and other animals is used more rarely. Typically, fillers include meat, fat, suet, bread, sweet potato, barley, and

oatmeal. Black pudding is a blend of onions, pork fat, oat meal, flavorings and blood.

There are several other products available in the market which utilises blood products as an ingredient. Advances in food technology combines blood derived products in non-meat processed food and dietary supplements. Spray dried plasma are used as an egg substitute in the bakery products because of the foaming and leavening properties of blood plasma proteins. 'Pasta' is another food in which it is being incorporated for enriching the protein content. Plasma product 'Immunolin' is used as an active ingredient in dietary supplements to boost immune function. Blood proteins which are abundant, cheap and readily available have been recommended by WHO and FAO for use as protein supplement in infant formula to tackle protein malnutrition in developing countries. Plant protein has lower protein level, lack essential amino acids and contains anti-nutritional factors. Processing plant proteins such as 'soy' to eliminate anti-nutritional factors greatly increases their cost and defeats the purpose of their use as a low cost and high quality protein to substitute for animal proteins. In addition, success of blood fortified foods in addressing iron deficiency has been reported.

V. Rajkumar, A. K. Verma and A. K. Das

Utility of Data Recording in Genetic Improvement of Goats

For genetic improvement program in goats, breeding objectives should be translated into measurable production traits which can be regularly and readily recorded. Farm records are essential for ascertaining the pedigree, implementing breeding program for improvement of the flock, keeping track of various farm efficiency indicators, culling of under-productive animals and economical feeding of animals. There are two types of records that commercial farmers can keep i.e. production records and financial records. These are the records that allow commercial farmers to track the performance of individual animals and their flock as a whole. One of the major challenges of production records is getting the data recorded in a means that can be used to evaluate the flock. The records that are attained must be compiled into a system to allow year to year comparisons. In addition, the effectiveness of changes in management can be evaluated. Furthermore the analysis of long term records will allow the weaknesses and strengths within the flock and management to be identified. Data recording allows goats and their data to be transferred when required, and it also allows formulating appropriate policy of goat improvement. Records can be divided according to different activities of

farm like numbering of goats, breeding records, kid growth records, milk production records, feeding and health records. For data recording, identification of goat, buck and kids are required. For identification of the animals, a proper identification system is needed. Animals may be identified by their name or a number depending on the preference of the scientist or commercial farmer. Pure-bred animals are identified as part of a registration process which assists in breeding.

A good flock recording system will include identification of each animal as soon as possible after birth. In addition to the identification name or number, the kids' birth date, its size, buck and dam's identification number should be recorded. Buck identification is important to use the buck in appropriate manner. To start a lactation, a goat has a kidding date and at the end of a lactation a drying of date. These can be used in the calculation of lactation production. By collecting some additional data such as identified heat dates, mating dates and bucks used, kidding information and a very useful bank of data is developed to better manage their flock and apply selection and breeding program to improve the flock genetically. It also provides data to identify health issues such as mastitis, reproductive problems and their treatments.

S. Bhusan

Institute Management Committee (IMC) Meeting

Institute Management Committee (IMC) meeting was held on 12th June 2013. The IMC was chaired by Dr. S.K. Agarwal, Director, CIRG, Makhdoom. The other members participated in the meeting were Dr. A.C. Varshney, Vice-Chancellor, DUVASU, Mathura; Dr. Dharendra Singh, Head, Animal Health Division, CSWRI, Avikanagar; Dr. Taru Sharma, Head, Veterinary Physiology

and Climatology Division, IVRI, Izatnagar; Dr. Sanjiv Singh, Senior Scientist, NBAGR, Karnal; Dr. S.K. Singh, Head, GGB Division, CIRG, Makhdoom; Shri P.K. Singh, F&AO, CIRG, Makhdoom. Shri R.N. Mallik, A.O. CIRG, Makhdoom acted as the Member Secretary of the IMC. Important matters regarding the Institute development were discussed and resolved in the meeting.

Eco Day/World Environment Day (WED) - June 5, 2013

The theme for year 2013 World Environment Day was *Think-Eat-Save* and the host country was *Mongolia*. It is an anti-food waste and food loss campaign that encourages the people globally to reduce food print as well as to create awareness on the environmental impact of the food choices people make and empowers the people to make informed decisions.

Marketing Strategies in Goats for Better Price Discovery

The commercialization of goat farming is getting popularity as a result of market developments, financial incentives, and demand for high value commodities (animal protein). A gradual shift is occurring towards intensively managed goat units from extensive units. Marketing is an important aspect of any production process. Goat marketing is one of the most unexplored areas and majority of the goat markets in the country are unorganized. Documentation on number of goat markets, fair/hats and their frequencies, status of buyers and sellers, volume of trade, nature of competition, role of middlemen and finance hardly have been attempted. Presence of large number of middlemen reduces the producer's share in consumer's rupee. Goat markets should be regulated similar to foodgrains markets for smooth and effective marketing of goats.

The new marketing system is expected to improve efficiency in goat production from subsistence to a commercial venture. This needs an integration of small scale producers on the supply chain as majority of goats are reared by the poor farmers. In most of the places, goats are traded in the cattle/goat fairs organized at conventional places through market committee at fixed intervals. A large part of the consumer's costs are due to inefficient channels, and high market as well as transportation costs. Understanding the market and preparing itself to respond to emerging market trends would be the prime instrument for enhancing the domestic livelihood opportunities in the goat sector. There is an absolute necessity for market oriented goat production system. A success of goat farming depends on successful goat marketing. Knowledge of market dynamics is a key to efficient goat marketing. Seasonality in sale price and price pattern are some important factors to affect market decisions. These decisions are:

- What to sell? – Live goat (meat or breeding goats).
- When to sell? – Weight, cost and time i.e. Eid, Dasher, Holi and Durga Puja.
- Where to sell? – At farm or goat market.
- Whom to sell? – Butcher/retail outlets, meat trader or breeder farmers.

Sale price of live goats are directly proportional to the market price of goat meat. Farmer should plan to

maximize their sale at the time of festivals like Eid, Holi, Durga Puja and Dasher to realize 2-3 times higher price. The main marketable products include the fattened kids, culled animals, breeding animals, manure and milk. Potential buyers like big retail meat outlets and wholesale traders should be identified to bypass middlemen for better price realization. Goat farmers are encouraged to organize collective sale in wholesale market instead of desperate /distress sale for better price discovery. Buyers and sellers should be aware about the market trends which includes supply, price and their seasonality. Goat farmers should rear good quality goats in the right flock size for optimum production. Grading of animals is an important tool in goat marketing. Good quality (healthy) animals should be sold at premium price instead of in a lot. Market integration (Horizontal and vertical) should be encouraged among goat keepers to increase marketing efficiency and to minimize marketing cost. Weight, age, sex, breed and colour are the important determinants of sale price of goat. Male kids to be sold for BAKRA Eid should be above one year of age and healthy without any deformity at the time of selling. Generally, goats with golden brown to dark brown coat colour fetch more price as compared to others. Breeding does are normally sold during the months of February to May and meat goats are sold during October to February.

Transportation of marketed goats is another important aspect of goat marketing. Special care for the animals are required while they are transported for long distance. The number of goats to be transported depends on size of vehicle and goats. Generally, 70-75 goats can be transported in a truck. Goats should be given food and water before loading and should be transported 3-7 days after vaccination. Sick or weak animals should be segregated and animals suffering from infectious diseases should be avoided for transport. Poor nutrition and movement stress enhances the parasitic and bacterial infections. Therefore, for long distance journey, animals are to be given rest for 1-2 hours after 6-7 hours journey, in a dry clean area with access to drinking water. Buyers should make sure that vehicle must have proper aeration and animals should be separated based on age group to avoid staggering over each other and suffocation. Provision of bedding for the animals preferably dry paddy stalks is recommended for welfare of goats.

A.K.Dixit, Braj Mohan, Khushyal Singh and U.C.Yadav

Extension and Farmers Education Programs

Farmers' Training organised

- Ten days 53rd National Training Programme on Scientific Goat Farming during 16-25 January, 2013. Forty five (45) participants attended the training programme from different states of the country.
- Five days training programme on Scientific Goat Farming to 19 goat farmers during 11-15 March 2013. This training was sponsored by ATMA, Siwan district, Bihar.
- Ten days 54th National Training Programme on Scientific Goat Farming during 1-10 May 2013. It was attended by 58 participants from 12 states of the country.

Exhibition/KisanMela participated to display CIRG technologies

- 19th Sarson Vigyan Mela at Directorate of Rapeseed-Mustard Research (DRMR), Sewar, Bharatpur, Rajsathan on 03rd February 2013.
- National Dairy Mela at NDRI, Karnal, Haryana on 25-27th February 2013 (Won IIIrd Prize).
- Pusa Krishi Vigyan Mela at IARI, New Delhi on 06-08th March 2013 (Won IInd Prize-Uttam).
- Kisan Mela at Katihar, Bihar on 17-18 March 2013.
- Bhed Mela at CSWRI, Avikanagar, Rajasthan on 23rd March 2013.



Trainers Training organised

- Two days training programme on Scientific Goat Farming Technologies and Extension Approaches for 17 KVK's Subject Matter Specialists during 26-27 February 2013. This training was sponsored by Zonal Project Directorate (ICAR), Kanpur.
- Eight days training programme on Goat Production and Health Management for 10 supervisors of BAIF, Pune during 1-8 March 2013.
- Seven days training programme on Nutrition, Management and Prevention of goat diseases for optimum productivity for 13 Veterinary officers from U.P. And Uttarakhand states during 10-16 April 2013. It was sponsored by DADF, GOI, New Delhi.
- Six days training programme on Leadership development for sustainable goat production for 17 BAIF officers, Pune during 22-27 April 2013.
- Five days training programme on Scientific Goat Farming for 10 Veterinary officers of Punjab Animal Husbandry Department during 20-24th May 2013. It was sponsored by Punjab Veterinary Council, Chandigarh.

Extension and Farmers Education Programs

One day Training Programme for rural women organised

Mahila Samakhya (NGO), Mathura sponsored a one day Training Programme on Scientific Goat Farming for rural women through Department of Education, Ministry of Human Resource Development, Government of India on 23rd March 2013 at CIRG, Makhdoom. This training aimed at women empowerment and livelihood security through goat rearing. In this training programme, Dr S.K. Agarwal, Director, CIRG apprised the women goat rearers about the economic benefits of goat farming. Scientists of the Institute explained the women folk about the feeding practices under intensive rearing system, salient features of breeding, issues related to housing as well as disease prevention and control strategies in goats. Dr. P.K. Rout, Incharge PME concluded the training programme with vote of thanks. This training was coordinated by Drs Ashok Kumar and Nitika Sharma of Animal Health Division.



Farm Innovator's day organized

Institute organized second Farm Innovator's day on 27th April 2013. Dr. A.K. Mishra, Vice Chancellor, MAFSU was the Chief Guest and Dr. Rakesh Babu Gangwar, Deputy Director Agriculture, Uttar Pradesh was the Guest of Honour on this occasion. The chief guest of the function while delivering his inaugural address praised the efforts made by CIRG in the field of goat husbandry and informed that goat is one of oldest animal to be domesticated by man and is an important animal for providing livelihood security and alleviating poverty. He accentuated that interactions like Farm Innovator's day will serve to answer the issues of a sustainable goat husbandry under the burden of increasing population, decreasing land and forage resources and climate change in addition to entrepreneurship development, reducing involvement of middlemen in goat marketing, value addition of goat products etc. The Guest of Honour in his address emphasized that inputs like improved breeds, improved nutrition and better health care facilities should be readily accessible to farmers for achieving optimum production in the field of animal husbandry. Dr. S.K. Agarwal, Director, CIRG presided over the function and highlighted the importance of goat husbandry in



the rural scenario in terms of diminishing pastures and grazing land. He further stressed upon the use of technologies developed and available at CIRG like artificial insemination for breed improvement. The farm innovators day was attended by 167 farmers including progressive farmers, BAIF officers and women from Mahila Samakhya, an NGO from Mathura. On this occasion, few farmers shared their experiences and local remedies and innovations related to goat farming. Five progressive goat farmers were awarded with appreciation certificate for sustaining and motivating other farmers in the field of goat rearing.

AI Technology using Frozen Semen in Goats

Technology Developed

AI with frozen-thawed semen has been successfully employed in India for large scale genetic improvement in cattle and buffalo. However, use of frozen-thawed semen has been relatively limited in caprine reproduction and is still to be explored extensively for wider use in India. Freezing of caprine semen is technically challenging as it contains the bulbourethral secretion capable of interacting with the cryoprotectants used, the freezing and thawing processes results in reduced viability, motility and velocity of sperm movement. This in turn causes decrease in conception rate when frozen-thawed semen is used for AI. Moreover, the anatomical arrangement of cervix in goats and the difficulty in traversing it, demands skill and a relatively higher number of sperm cells to obtain reasonable

pregnancy rate via transcervical insemination.

Oestrus was detected twice daily using an aproned buck at a time interval of about 12 h. A total of 32 estrus goats were inseminated between 10 to 12 h after detection of standing heat, and a second AI was performed 12 h later. A lubricated glass speculum was inserted into the vagina after cleaning the vulval region of the goat. A flashlight/sun light was used to illuminate the cervix and the external os was located. The insemination gun was inserted through the vaginal speculum, fixed into the external os and then manoeuvred deeply into the cervix as far as possible, and the semen was released slowly. The females were held in the same position for 2-3 minutes and the vulva was massaged gently.



Twin Kids



Triplet Kids



Jamunapari Kids born through A.I.

Out of 32 Jamunapari goats inseminated, 17 became pregnant with a pregnancy rate of 53.12%. One doe gave triplets, nine does delivered twins and seven does produced singles. Thus 17 does delivered 28

kids that resulted in to 1.64 kids per goat. The results indicated that AI with frozen semen could successfully be used for conservation and propagation of goats.

S. D. Kharche, S. K. Jindal, R. Priyadharsini, Satish Kumar, A. K. Goel, N. Ramachandran and P. K. Rout

Awards and Recognitions

Recognition

Dr. S.D. Kharche, Principal Scientist, CIRG, Makhdoom received recognition as an expert in reproduction during one day Shetakari Prashikshan Shiveer on 16th March 2013 at Kaswad, Panchgani, Mahabaleshwar Dist. Satara (MS).



Goat Meat and Milk Based Value Added Products

Goat milk and cream based 'CIRG Beans' and 'CIRG Khasta' were developed using pure goat milk, cream, dietary fibres and natural antioxidants. These products contain higher amount of medium chain fatty acids, which are known to be beneficial for human health. Organoleptic attributes revealed that these products has score of 8 out of 9 of

various parameters under hedonic scale. Flavour and colour of the product was more appealing to the sensory panelists. These products were snacks type with low moisture, high protein and desirable fatty acids profile as well as higher shelf-life.

Another meat based snack food

'CIRG Meat Sticks' was developed with the aim to provide good quality protein along with valuable micronutrients to consumers. These products are highly nutritious and palatable, enriched with dietary fibre. These technologies are commercially viable which helps to develop small scale industry.



A. K. Das, A. K. Verma and V. Rajkumar

RAC Meetings organized

The 19th of RAC meeting was held on 29th May 2013 under the chairmanship of Dr. V. Prabhakar Rao, Vice Chancellor, SVVU, Tirupati. The other members of the committee were Dr. B.S. Prakash, ADG (AN&P), ICAR; Dr. S. K. Dwivedi, Former Director, NRC Equines, Hissar, Haryana; Dr. N. Krishnan, Former Associate Dean, COVS, ANGRAU, Rajendranagar, Hyderabad; Dr. S. N. Maurya, Former V.C., DUVASU, Mathura; Dr. N. Kumanan, Professor, Biotechnology, TANUVAS; Dr. S.K. Aggarwal, Director, CIRG, Makhdoom. Dr. P.K. Rout, Incharge PME Cell acted as Member Secretary. The meeting started with a warm welcome to RAC team on the behalf of the CIRG fraternity followed by invocation of ICAR song. Director, CIRG presented a brief profile of the Institute, achievements, action taken reports (ATR) of 18th RAC recommendations, approved research Programmes and activities for XII plan. The Chairman RAC and Members congratulated Director, CIRG for achievements of the Institute and the initiatives taken up for XII plan. The RAC team after hearing the division wise research achievements and ATR's expressed their happiness over implementation of RAC recommendations successfully.



Design and Popularisation of Low Cost Shelter Models for Goats in Disadvantaged Districts of Bundelkhand Region

Housing plays an important role to protect goats from extreme weather conditions and parasitic infestations. To achieve maximum production, proper housing of goats is essential besides nutrition and health inputs. Survey conducted in adopted villages of Bundelkhand region revealed that maximum goat keepers (>92%) do not provide optimum shelter/housing for their goats. It might be due to poor knowledge, lack of space and 'need realization' besides poverty. Goat keepers who have small flock (2-5) maintain their goats with cows and buffaloes and inside human dwellings. Maximum goat shelters do not have adequate floor and ventilation space, open and closed structures to protect them from inclement weather, provision of direct sunlight exposure and urine disposal. Goat keepers with larger flock maintain goats of all age group either in a room or verandas. Some of the goat keepers (18%) keep their goats in enclosure made up of stone and thorny bushes without roof. Prevailing goat shelters without proper

protective structure along with poor hygiene and sanitation reduce resistance against diseases besides huge production loss on account of decreased performance and survivability. Therefore, goat keepers were sensitized and motivated to construct improved low cost goat shelters. To promote scientific goat housing in the Bundelkhand region, shelter models of two sizes for accommodating 10 and 20 goats, respectively were designed and constructed following recommended scientific principles for floor and ventilation space, roof height etc using locally available materials like eucalyptus wooden poles of different sizes, bamboo wire mesh, white polythene etc which were purchased from the local market. The dimension and orientation of shelter varied with the availability of space with the goat keepers. The approximate cost of shelter was around Rs. 8400.00 in which 30% was shared by the selected beneficiaries in the form of locally available roofing materials, labor etc. The thick white colored polythene sheet



Goat Shelter before intervention



Goat Shelter after intervention

was used to protect the roof made of dried grass/weed from rain. The farmers were also made aware of the importance of shelters and its management for goats through frequent interactions and off campus training. After construction of shelter for one or two beneficiaries in each adopted village, farmers got motivated and constructed about 60 low cost shelters for their goats.

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