

## Profile for Website



**Name** : Dr. Saket Bhusan  
**Designation** : Principal Scientist (Animal Genetics & Breeding)  
**Present Pay** : Rs. 188200  
**Gross salary** : Rs. 212319 /-pm  
**Date of birth** : 01. 07. 1960  
**Marital Status** : Married  
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### **1. Educational Qualification**

| Qualification   | Year | University  | Subject         |
|-----------------|------|---|-----------------|
| Ph.D.           | 1989 | Indian Veterinary Research Institute, Izatnagar, Bareilly (UP)                    | Animal Genetics |
| Post-Graduation | 1984 | G. B. Pant University of Agriculture & Technology, Pantnagar, Distt. Nanital (UP) | Animal Breeding |
| Graduation      | 1980 | Bundel Khand University, Jhansi, (UP)   | Agriculture     |

**2. Current Research Area:** Animal Breeding & Molecular Genetics

**3. Major Research Accomplishment:** I have worked as P. I. (Principal Investigator) and Co-P.I. (Corporate Principal Investigator) in the following Projects.

### **(A) Research work done in National Research Centre on Mithun, Nagaland:**

**(1) PROJECT TITLE:** IMPROVEMENT OF MITHUN THROUGH SYSTEMATIC BREEDING

**Capacity in the project** : Principal Investigator

**Achievements of the project:**

- a. Mithuns were treated as semi wild animal in the region hence no breeding policy was adopted by the state governments and farmers. Therefore, this project was started to start systematic breeding programme first time in the milthun herd.

- b. I have recorded various productive (milk production and body weight etc) and reproductive traits of mithuns. .
- c. Breeding males and females were selected at 12 months of body weight for meat production.
- d. Selective breeding programme was started for four strains of mithun.
- e. Milk production from mithun cows was started first time from institute's herd during the project which was used by the farm laborers. This was a good experiment to popularize milk production from mithun cows.

**Impact of the Project:**

A systematic breeding programme was started successfully in institute's herd of mithun. This mithun herd was used as demonstrative breeding unit for the farmers of Naga community. Many Nagas farmers started to use mithun milk for tea preparation. The mithun's farmers did not use this ability of mithun earlier.

**(2) PROJECT TITLE: GROWTH AND BIOMETRICAL MEASUREMENTS OF MITHUN**

**Sub Project: BIRTH WEIGHT AND BIOMETRY OF MITHUN**

**Capacity in the project : Co-Principal Investigator**

**Achievements of the project:**

- (a) Birth weight and biometry have been found to have a direct correlation with subsequent growth of the calf.
- (b) Birth weight was recognized as one of the important trait of meat animals.

**Impact of the project:** Birth weight, body length and heart girth were recommended to select a calf at first stage for future bull.

**(3) PROJECT TITLE: CYTOGENETIC AND DNA INVESTIGATION IN MITHUN**

**Capacity in the project : Principal Investigator**

**Achievements of the project:**

- a. Identified and confirmed four strains of mithun (*Bos frontalis*) at molecular level and measured the genetic relation between four strains of mithun by randomly amplified polymorphic DNA markers (RAPD-PCR) (**first report in India**).
- b. Measurement of genetic relation of mithun at DNA level with other livestock species (cattle, buffalo, sheep and goat) was MASA markers (Microsatellite Associated

Sequence Amplification) and randomly amplified polymorphic DNA (RAPD-PCR) markers (**first report in India**).

**Impact of the project:** I have recognized four strains of mithun at DNA level so that selective breeding and line (strain) breeding for different strains in mithun was advocated to increase the meat production of different strains of mithun. I measured the genetic relation of mithun with cattle, buffalo, sheep, and goat and it was identified that mithun have genetic distance with buffalo and cattle like sheep and goat hence it was advocated that there is no religious hurdle to slaughter mithun for red meat.

**(4) PROJECT TITLE:** EVALUATION SEMINAL PARAMETERS OF MITHUN

**Capacity in the project : Co- Principal Investigator**

**Achievements of the project:**

- (a) Various biochemical parameters of mithun semen collected by AV and RP methods were measured.
- (b) Various physical parameters, acrosome reaction, biometrical parameters were measured of Mithun semen collected by AV and RP method.

**Impact of the project:** On the basis of project results, a plan on cryo-preservation of mithun semen was formulated.

**(5) PROJECT TITLE:** COLLECTION AND EVALUATION OF MITHUN SEMEN

**Capacity in the project : Co- Principal Investigator**

**Achievements of the project:**

- (a) Various parameters of head, mid-piece, tail abnormalities of mithun spermatozoa were measured.

**Impact of the project:** Results were used to select mithun bulls for breeding and fertility rate of herd was increased.

**(B) Research work done in Central Institute for Research on Goats, Makhdoom, Mathura**

**(UP):**

**(1) PROJECT TITLE:** GENETIC EVALUATION AND IMPROVEMENT OF JAKHRANA GOATS FOR MILK AND MEAT PRODUCTION

**Capacity in the project : Principal Investigator**

**Achievements of the project:** Genetic evaluation of Jakhrana breed for different productive traits has been done for improvement and conservation of the breed.

**Impact of the project:** Evaluated the Jakhrana breed for milk and meat production and found that this breed has tremendous ability to produce milk and meat and as a result many farmers started commercial Jakhrana goat farm.

**(2) PROJECT TITLE:** GENETIC EVALUATION AND IMPROVEMENT OF JAKHRANA BREEDS THROUGH OPEN NUCLEUS BREEDING SYSTEM (ONBS)

**Capacity in the project: Principal Investigator**

**Achievements of the Project:** An experiment on open nucleus breeding system is being conducted and a nucleus flock of Jakhrana goat has been maintained of high genetic merit. The outstanding breeding bucks are to be let out from the nucleus flock to the farmers flock to bring out genetic improvement of their animals.

**Impact of the project:** 50 Jakhrana bucks are produced to supply farmers' field for improvement of nondescript and local goats.

**(3) SUB PROJECT TITLE:** USE OF RAPD MARKERS FOR GENETIC DIVERGENCE STUDY IN JAKHRANA GOATS (CAPRA HIRCUS)

**Capacity in the project: Principal Investigator**

**Achievements of the project:** Study confirms that there is DNA polymorphism between high and low milk producer Jakhrana goats. Genetic distance between high and low milk producing lines of Jakhrana goats was distinguished by this study.

**Impact of the project:** Possibility is opened to search out line specific markers for high milk producing goats.

**(4) SUB PROJECT TITLE:** GENETIC POLYMORPHISM IN JAKHRANA GOATS AND ITS RELATION WITH OTHER GOAT BREEDS AT MOLECULAR LEVEL

**Capacity in the project: Principal Investigator**

**Achievements of the project:** Out of 16 polymorphic loci, only two loci i.e. PI<sub>18-800</sub> and PI<sub>14-330</sub> were found to be specific to Jakharana breed. These loci have the frequencies 0.85 and 0.57 in Jakharana breed and have zero frequency in other four goat breeds. Minimum genetic distance was observed between Barbari and Jakharana breeds (0.020), Jamnapari and Jakharana showed maximum genetic distance of 0.183 while other goats breeds showed genetic distance in between of these two figures.

**Impact of the project:** Genetic relations between different goat breeds at molecular level are used for different breeding program of breed conservation and improvement.

**(5) PROJECT TITLE:** CONSERVATION AND IMPROVEMENT OF JAMUNAPARI GOATS IN ITS HOME TRACT

**Capacity in the project : Co- Principal Investigator**

**Achievements of the project:** Elite bucks of Jamunapari goats were supplied to the goat farmers of home tract in two villages. Population dynamics, reproductive performance, fitness parameter, body weight, milk yield and disease incidence of Jamunapari goats in its home tract were recorded to evaluate the improvement. The mean body weight at birth, 3 and 6 month of age was reached at  $2.47\pm 0.05$ ,  $13.52\pm 0.39$ ,  $19.47\pm 1.55$  kg, respectively. The average total milk yield for 30, 60 and 90 days were reached up to 31.45, 69.17 and 104.12 liters, respectively

**Impact of the project:** The average population growth of Jamunapari goats in home tract is reached from 32.21% to 57.69%. The increasing trend in body weight at 3, 6 and 9 months of base population were observed over the year. Farmers became quite aware to use better-selected bucks, to avoid inbreeding and to use of vaccines for preventing the diseases.

**(6) PROJECT TITLE:** IMPROVEMENT OF JAKHRANA BREED OF GOAT (CAPRA HIRCUS) FOR MILK AND MEAT PRODUCTION UNDER FARM AND FIELD CONDITION.

**Capacity in the project : Principal Investigator**

**Achievements of the project:** Elite bucks of Jakhrana goats were supplied to the goat farmers and government and non-government agencies. Reproductive performance, , body weight, milk yield and disease incidence of Jakhrana goats were recorded to evaluate the improvement. The mean body weight at birth, 3, 6, 9 and 12 month of age was reached at  $2.71\pm 0.38$ ,  $9.29\pm 0.16$ ,  $14.40\pm 0.27$ ,  $17.92\pm 0.43$ ,  $25.52\pm 0.92$  kg, respectively. The average ninety and 150 days per goat average milk production of Jakhrana were  $126.06\pm 8.07$  kg (1.4 kg per day) and  $192.01\pm 4.59$  kg (1.28 kg per day), respectively.

**Impact of the project:** The increasing trend in body weight at 3, 6 and 9 months of base population were observed over the year. Birth weight, 6, 9 and 12 months body weight of kids were increased 7.53, 34.20, 31.28 and 27.34 %, respectively in 2011 over than 2005. Milk production of 30, 60, 90, 120, 150 days were increased 28.65%, 25.95%, 28.63%, 44.47% and 55-37%, respectively in 2011-12 in comparison of 2009-10.

**(7) PROJECT TITLE:** GENETIC EVALUATION AND IMPROVEMENT OF JAKHRANA BREED FOR MILK AND GROWTH TRAITS.

**Capacity in the project : Principal Investigator**

**Achievements of the project:** Total thirty seven (37) breeding males and 79 breeding does were supplied to the farmers/ other government and non-government agencies/ other for breed improvement in 2015-16. Average body weight at 3, 6, 9 and 12 months of Jakhrana kids born in 2015-16 and 2016-17 were increased than kids born in 2012-13. Years were found highly significant for all body weights of kids. Results indicated that selection of bucks at 9 month body weight also significantly affects the 3, 6, 9 and 12 month body weight. Milk yield of 30, 60, 90, 120 and 150 days of does kidded in 2015-16 and 2016-17 were increased. Milk production of 30, 60, 90, 120 and 150 days of does kidded in of 2015-16 and 2016-17 were higher than milk production of 2012-13 due to selection pressure.

**Impact of the project:** Average body weight at 3, 6, 9 and 12 months of Jakhrana kids born in 2015-16 and 2016-17 were increased than kids born in 2012-13. Milk production of 30, 60, 90, 120 and 150 days of does kidded in of 2015-16 and 2016-17 were higher than milk production of 2012-13 due to selection pressure.

**(8) PROJECT TITLE:** GENETIC IMPROVEMENT OF JAKHRANA GOATS FOR MILK PRODUCTION IN FIELD CONDITIONS.

**Capacity in the project : Principal Investigator**

**Achievements of the project:** Project is continue

**(9) PROJECT TITLE:** LIVELIHOOD SECURITY OF RURAL WOMEN THROUGH SCIENTIFIC GOAT FARMING (DST-SORF).

**Capacity in the project : Mentor of the Project**

**Achievements of the project:** Project is continue

**(10) PROJECT TITLE:** COMPARATIVE STUDY ON DIFFERENT STRUCTURES OF GOAT SHELTERS UNDER FARM CONDITIONS.

**Capacity in the project : Co-Principal Investigator**

**Achievements of the project:** Project is continue

**(11) PROJECT TITLE:** ALLELE MINING IN CAPRINE KISSPEPTIN AND GPRSG GENES IN ASSOCIATION WITH FECUNDITY IN INDIAN GOATS.

**Capacity in the project : Co-Principal Investigator**

**Achievements of the project:** Project is continue

**(12) PROJECT TITLE:** EVALUATION OF HERBAL IMMUNOMODULATORS FOR MANAGEMENT OF WEANING STRESS IN GOAT KIDS.

**Capacity in the project** : Co-Principal Investigator

**Achievements of the project:** Project is continue

**(13) PROJECT TITLE:** NETWORK PROJECT ON SHEEP IMPROVEMENT. - MUZAFFARNAGRI UNIT.

**Capacity in the project** : Co-Principal Investigator

**Achievements of the project:** Project is continue

**Externally funded projects:**

| PI/ Co PI/ Others                        | Title  | Year   | Amount              | Funding Agency  |
|--|--|--|---------------------|---|
| <b>Principal Investigator</b>            | 1. First line demonstration of oil seeds and pulses for adoption and diffusion of the techniques in Gonda district of UP.  | 1st November, 1993 to 21 <sup>st</sup> March, 1996                   | Rs. 6.0 lakhs       | Directorate of Extension, Ministry of Agriculture, Govt. of India |
| <b>Co-Principal Investigator</b>         | 2. Household Food and Nutritional Security under Jai Vigyan programme in Nagaland  | 30 <sup>th</sup> September, 1999 to 30 <sup>th</sup> September, 2002 | Rs. 10.0 lakhs      | NATP, ICAR, New Delhi   |
| <b>Consortium Principal Investigator</b> | 3. Goat husbandry based integrated approach for livelihood security in disadvantaged districts of Bundelkhand region of UP | April, 2008 to continue  | Rs. 537.370 5 lakhs | NAIP, ICAR, New Delhi   |

**4. Award(s):**

| Name of the award | Award organization (Place/ country) | Year | National / international/ institutional/professional society | Additional Information |
|-------------------|-------------------------------------|------|--|------------------------|
|                   |                                     |      |  |                        |

|                                    |   |      |  |   |
|------------------------------------|---|------|--|---|
| <b>Vigyan Bhartee Award</b>        | Vigyan Bhartee, Lucknow & Dept. of Science & Technology, Government of India  | 2000 | A award of Professional Society given by Science & Technology Minister (State), Govt. of India | Award was given to use of Hindi in science (Animal Science)                   |
| <b>Third All India Level Award</b> | Kendriya Sachivalaya Hindi Parishad, New Delhi                                | 2012 | A award of Professional Society given by Minister , Govt. of India                             | Award was given on Scientific & Technical Article in Hindi                    |
| <b>Best Paper Award</b>            | Best Paper award was given in 7 <sup>th</sup> NEEC Congress, 2014 at Shillong | 2014 | A award of Professional Society given by Minister, Govt. of Meghalaya                          | A lead paper was presented in 7 <sup>th</sup> NEEC Congress, 2014 at Shillong |
| <b>Third All India Level Award</b> | Kendriya Sachivalaya Hindi Parishad, New Delhi                                | 2016 | A award of Professional Society given by Minister , Govt. of India                             | Award was given on Scientific & Technical Article in Hindi                    |

##### 5. Trainings obtained:

| <b>Title of the training/ course/ program</b>                   | <b>Name and address of Conducting Organization</b> | <b>Duration</b> | <b>Year</b> | <b>Area</b>  |
|---|--|-----------------|-------------|--|
| Applied endocrinology in relation to production in farm animals | Haryana Agriculture University, Hissar             | 20 days         | 1990        | Use of hormone to increase production of livestock |
| UGC sponsored refresher course                                  | North eastern Hill University, Shillong            | 21 days         | 1996        | Cytogenetics                                       |
| Academic Staff orientation program                              | Aligarah Muslim University, Aligarah               | 29 days         | 1998        | Orientation program on teaching & research         |
| Applied statistical   | NDRI, Karnal                                       | 21 days         | 2000        | Use of statistics and                              |



|   |  |   |      |   |
|---|--|---|------|---|
| methodology with computer orientation in Animal breeding                    |  |   |      | computer program in Animal Breeding   |
| Quality Management System   | Institute of IT Resources, Dehradun                              | 1days (4 <sup>th</sup> December , 2012)   | 2012 | For ISO standard  |
| Researcher Training-VII: Analysis of Animal Science Data using SAS          | Indian Veterinary Research Institute, Izatnagar, Bareilly        | 6 days (9-14 January, 2012)               | 2012 | Analysis of Animal Science Data using SAS   |
| Management Development Programme on Leadership Development (Pre-RMP Cadre)” | National Academy of Agricultural Research Management, Hyderabad. | 12 days (26 November - 07 December , 2013 | 2013 | Learned the role of clear vision, integrity, creativity, fairness and assertiveness in research, extension, management and administration in the training |

#### 6. NOVEL TECHNOLOGY DEVELOPED:

- RAPD markers to measure genetic distance between four strains of mithun.
- RAPD-PAGE and MASA markers markers to measure genetic distance between Mithun (*Bos frontalis*) and other livestock species.
- RAPD markers to measure genetic distance between Jakhrana and other breeds of goats and to measure genetic distance between high yield and low yield Jakhrana goats.

#### 7. NOVEL METHODOLOGY DEVELOPED:

- Selective Breeding programme to develop lines of different strains of Mithun (*Bos frontalis*) for their improvement.
- Open nucleus breeding system for Jakhrana goats.
- Selective breeding in Jakhrana goats in intensive system of management for genetic improvement.

#### 8. NOVEL GENETIC STOCK DEVELOPED:

- Developed Arunachalee, Nagamese, Mizoram and Manipuri strains of Mithun (*Bos frontalis*) under selective breeding in semi-intensive system.

- Developed Jakhrana breed of goat at CIRG, Makhdoom for intensive and semi-intensive system.

## 9. Recent best publication

- Ajay Mondal, Roy, R., Saket Bhusan, Rout, P. K. and Sharma, M. C. 2010. Environmental effects on production traits of Jakhrana goat. *Indian J. of Animal Sciences* **80** (11): 1141-44.
- Bhusan S, Deepak Sharma and Rajkhowa C. 2010. Estimation of genetic relation of Mithun (*Bos frontalis*) with other livestock species through RAPD-PAGE. *Indian J. of Animal Sciences* **80** (1): 72-74.
- Bhusan, S., Sharma, A. and Tiwari, H. A. 2011. Health problems of Jakharana goats in the winter season under semi-intensive farming system. *The Indian Journal of Small Ruminants* 17(1):130-131.
- Bhusan, S. 2012. The effect of non-genetic factors on body weights of Jakhrana kids. *The Indian Journal of Small Ruminants*, 18 (2): 253-255.
- Bhusan, S. (2013). Genetic improvement of production and reproduction traits in goats of Jakhrana breed (in hindi). Vartmaan Vaigyaanik Anusandhan, DRDO, Ministry of Defence, 3: 124-127.
- Baqir M, Bhusan S, Sharma D, Kumar A, Saminathan M, K Dhama, Baladhare A, Yaday R, Prakash O and Renjoth R, Sonawane A, Kumar P and Chauhan A. 2014. Bovine IL12RB1, IL12RB2 and IL23R Polymorphisms and Bovine Tuberculosis (bTB) Infection Status. *Journal Of Pure And Applied Microbiology*, 8 (5): 4117-4124.
- Bhusan, S. and Gopal Das. 2015. Influence of non-genetic factor on body weights of Jakhrana kids. *Indian J. of Animal Sciences* 85 (1): 60-43.
- Bhusan, S. (2015). Influence of non-genetic factor on milk production of Jakhrana kids. *The Indian J. of Small Ruminants* 21 (1): 112-114.
- Aarti Sharma and Bhusan, S. 2015. Genetic polymorphism in Jakhrana goats and their comparison with other Indian goat breeds through RAPD. *Indian Journal of Animal Sciences* 86 (2):180-185.
- Aarti Sharma and Bhusan, S. 2016. Genetic diversity in milk production of Jakhrana goats based on RAPD markers. *The Indian J. of Small Ruminants* 22 (2): 157-160.
- Goel A K, Kharche S D, Jindal S K, Kumar S, Ranjan R, Singh S P and **Bhusan S.** 2016. Progesterone profile and ultrasonographic scanning of uterus during post partum period in Jakhrana goats. *Indian Journal of Animal Sciences* **86** (9) 1003-1005.
- Baqir M, Bhusan S, Kumar A, Sonawane A, Singh R, Chauhan A, Yaday R, Prakash O, Renjoth R, Baladhare A and Sharma D. 2016. Association of polymorphism in SLC11A1

gene with bovine tuberculosis trait among Indian cattle. *Journal of Applied Animal Research* 44 (1): 380-383.

- Singh Shoor Vir, Gupta Saurabh, Chaubey Kundan Kumar, Bhushan Saket, Rawat Krishna Dutta, Kumar Naveen, Tiwari Hari Audh, Chaturvedi Vinay, Sohal Jagdip Singh, Dhama Kuldeep and Hemati Zahra. 2017. Therapeutic Management of Incurable Paratuberculosis Using 'Indigenous Vaccine' in Goatherds, Endemically Infected with Johne's Disease. *International Journal of Pharmacology*, 13 (2): 145-155.
- Sharma Dinesh Kumar, Pal Souvik, Rout Promod Kumar, Mandal Ajay, Bhusan Saket, Sharma Nitika and Kushwah Yogendra Kumar. 2017. Caprine coccidiosis in semi-arid India: Dynamics and factors affecting fecal oocytes count. *Journal of Advance Veterinary and Animal Research* 4 (1): 52-57.
- Singh SP, Ramachandran N, Tripathi MK and Bhusan Saket. 2017. Physiological, biochemical and endocrine response of goat kids maintained on two different floor types in hot-dry weather condition. *Indian Journal of Animal Sciences* 87 (2) 223-228.
- Ramachandran N, Singh SP, Tripathi MK, Pal Souvik, Bhusan Saket and Jindal SK. 2017. Intake, growth performance and worm load in goat kids maintained on conventional soiled or raised wooden slatted floor. *Indian Journal of Animal Sciences* 87 (3) 356-360.
- Dass G, Dige MS, Rout PK and Bhusan, S. 2017. Pre-weaning growth and Kleiber Ratio in Muzaffarnagari Sheep. *Indian Veterinary Journal* 94 (06): 11-13.
- Bhusan, S. and Dass G. 2017. Effect of non-genetic factors on milk production in Jakhrana goats. *Indian Journal of Small Ruminants*, 23 (2): 168-171.
- Dass G, Dige MS, Rout PK and Bhusan, S. 2017. Pre-weaning growth and Kleiber Ratio in Muzaffarnagari Sheep. *Indian Veterinary Journal* 94 (6): 11-13.
- Verma R, Sharma DK, Paul S, Gururaj K, Dige M, Saxena VK, Rout PK, Bhusan S and Banerjee PS. 2018. Epidemiology of common gastrointestinal parasitic infection in goats reared in semi-arid region of India. *Journal of Animal Research* 8(1): 39-45.