

Department of Animal Genetics and Breeding is functioning since the establishment of the college in year 2008 under *Vanbandhu Kalyan Yojna* of Hon. Chief Minister's ten points programme. The department is engaged in imparting quality education to undergraduate and postgraduate students, to undertake research projects in the fields of animal genetics such as cytogenetics, molecular genetics, population genetics and animal breeding for the benefit of the society.

### **Major activities:**

#### **1. Teaching**

- Three courses of Animal Genetics and Breeding along with two courses jointly offered with Veterinary Medicine department to the undergraduate students as per the VCI 2008 norms since 2009-10.
- From year 2016-17, the course curriculum for Animal Genetics and Breeding is followed as per VCI-2016.
- Lecture notes and practical manuals as per the VCI 2008 for under graduate courses have been prepared and distributed free of cost to the undergraduate students.

#### **Courses taught to the undergraduate students**

| <b>Sr. No.</b>         | <b>Course title</b>                                            | <b>Course code</b> | <b>Course credit</b> |
|------------------------|----------------------------------------------------------------|--------------------|----------------------|
| <b>As per VCI 2008</b> |                                                                |                    |                      |
| 1.                     | Biostatistics and Computer Application                         | AGB 111            | 2 + 1                |
| 2.                     | Principles of Animal Genetics and Population Genetics          | AGB 121            | 2 + 1                |
| 3.                     | Livestock and Poultry Breeding                                 | AGB 211            | 2 + 1                |
| 4.                     | Zoo/Wild Animal Breeding Management, Nutrition and Health Care | VMD 512*           | 1 + 1                |
| 5.                     | Pet Animal Breeding, Management, Nutrition and Health Care     | VMD 513*           | 1 + 1                |
| <b>As per VCI 2016</b> |                                                                |                    |                      |
| 1.                     | Animal Genetics and Breeding                                   | AGB                | 3 + 1                |

\* Jointly with Veterinary Medicine

**Teaching material prepared for the undergraduate courses**

| Sr. No                                              | Course Title                                                    |
|-----------------------------------------------------|-----------------------------------------------------------------|
| <b>Practical manuals (printed from ICAR budget)</b> |                                                                 |
| 1.                                                  | Biostatistics and Computer Application (AGB-111)                |
| 2.                                                  | Principles of Animal Genetics and Population Genetics (AGB-121) |
| 3.                                                  | Livestock & Poultry Breeding (AGB-211)                          |
| <b>Lecture notes</b>                                |                                                                 |
| 1.                                                  | Biostatistics and Computer Application (AGB-111)                |
| 2.                                                  | Principles of Animal Genetics and Population Genetics (AGB-121) |
| 3.                                                  | Livestock & Poultry Breeding (AGB-211)                          |

- Seventeen courses for Animal Genetics and Breeding, 2 courses for Applied Biostatistics and one course of Disaster Management are offered at Post Graduate and Ph.D. level as per ICAR norms 2009.

**Courses taught to the postgraduate students – as per ICAR 2009**

| Sr. No.                   | Course title                                                 | Course code | Course credit |
|---------------------------|--------------------------------------------------------------|-------------|---------------|
| <b>At Master's level</b>  |                                                              |             |               |
| 1.                        | Animal Cytogenetics and Immunogenetics                       | AGB 601     | 2 + 1         |
| 2.                        | Molecular Genetics in Animal Breeding                        | AGB 602     | 2 + 1         |
| 3.                        | Population and Quantitative genetics in Animal Breeding      | AGB 603     | 2 + 1         |
| 4.                        | Selection Methods and Breeding Systems                       | AGB 604     | 3 + 1         |
| 5.                        | Biometrical Techniques in Animal Breeding                    | AGB 605     | 3 + 1         |
| 6.                        | Conservation of Animal Genetic Resources                     | AGB 606     | 2 + 0         |
| 7.                        | Cattle and Buffalo Breeding                                  | AGB 607     | 2 + 1         |
| 8.                        | Small Farm Animal Breeding (sheep, goat, Swine and rabbit)   | AGB 608     | 2 + 0         |
| 9.                        | Poultry Breeding                                             | AGB 609     | 2 + 1         |
| 10.                       | Laboratory Animal Breeding                                   | AGB 610     | 1 + 0         |
| <b>At Doctorate level</b> |                                                              |             |               |
| 1.                        | Recent Advances in Animal Genetics                           | AGB 701     | 2 + 0         |
| 2.                        | Recent Trends in Animal Breeding                             | AGB 702     | 2 + 0         |
| 3.                        | Advances in Biometrical Genetics                             | AGB 703     | 2 + 1         |
| 4.                        | Advances in Selection Methodology                            | AGB 704     | 2 + 1         |
| 5.                        | Bioinformatics in Animal Genetics and Breeding               | AGB 705     | 2 + 0         |
| 6.                        | Advances in Molecular Cytogenetics                           | AGB 706     | 2 + 0         |
| 7.                        | Utilization of Non-additive Genetic Variance in Farm Animals | AGB 707     | 2 + 1         |

- Since the inception of the department, four students at Master's level and three students at Ph.D. level have completed their degree from this department.

| <b>Sr. No.</b> | <b>Name of the Student</b> | <b>Degree (Year of completion)</b> | <b>Title of the thesis</b>                                                                                                                                                    |
|----------------|----------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.             | Banwarilal Yadav           | M.V.Sc. (2013)                     | Study of leptin gene polymorphism in Surti and Jaffarabadi buffalo by PCR-RFLP                                                                                                |
| 2.             | Kuldeep Tyagi              | Ph.D. (2016)                       | Relative Gene Expression Analysis of Milk Protein Genes in Primary Bovine Mammary Epithelial Cells of Surti and Mehsani Buffaloes                                             |
| 3.             | Yogendrasingh H. Gadhavi   | M.V.Sc. (2016)                     | Study of DGAT1 gene Polymorphism in Surti and Banni Buffaloes by PCR-RFLP                                                                                                     |
| 4.             | Mamta Janmeda              | Ph.D. (2016)                       | Relative Gene Expression Study of Genes Associated with Fatty Acid Synthesis in Bovine Mammary Epithelial Cells of Surti and Jafarabadi Buffaloes                             |
| 5.             | Pandya Gaurav M.           | Ph.D. (2017)                       | Relative Gene Expression Analysis of B-Casein Milk Protein and its Transcription Regulatory Genes in Primary Bovine Mammary Epithelial Cells of Surti and Jafrabadi Buffaloes |
| 6.             | Jyotishree Bayan           | M.V.Sc. (2017)                     | Study of Growth hormone gene polymorphism in Surti and Mehsani goats by PCR-RFLP                                                                                              |
| 7.             | Pawar Vallabh D.           | M.V.Sc. (2017)                     | Study on effects of non genetic factors on economic traits and genetic as well as environmental trends of lactation yield in Surti buffalo                                    |

- At present, one student each undergoing PhD and MVSc degree programmes.

| <b>Sr. No.</b> | <b>Name of the students</b>            | <b>Degree</b> |
|----------------|----------------------------------------|---------------|
| 1              | Nikhil S. Dangar (Inservice candidate) | Ph. D.        |
| 2              | Tara Sangma (admission through ICAR)   | M.V.Sc.       |

## 2. Research

At present, the department has well established Cytogenetics and Molecular genetics laboratories. The department has carried out research projects in the fields of Cytogenetics as well as Molecular Genetics as follows funded by Navsari Agricultural University.

| Sr. No. | Title of the research projects                                                                                  | Area of work       | Status      |
|---------|-----------------------------------------------------------------------------------------------------------------|--------------------|-------------|
| 1.      | Cytogenetic Screening of Surti Buffalo                                                                          | Cytogenetics       | Completed   |
| 2.      | Analysis of Chromosomal Abnormalities in Surti Buffalo Using Fluorescence <i>In Situ</i> Hybridization (FISH)   | Cytogenetics       | In progress |
| 3.      | Study of genetic polymorphism in growth related genes and its association with growth parameters in Surti goats | Molecular Genetics | In progress |

### 3. Extension

The faculty members of the department are actively involved in the extension activities like training of Veterinary Officers and Livestock Inspectors of the state in the areas of poultry, goat and dairy husbandry. Faculty also participate in Krushimahotsav, Pashupalan Shibirs, Marghapalan Shibirs, Bakrapalan Shibirs etc. organized by Department of AH, Govt. of Gujarat, Cooperative Dairies or NGOs.

### Facilities:

The department has well equipped Biometrical and Computer laboratory with internet facilities for UG students as per VCI and PG teaching. The department has all the infrastructure and equipment facilities as per the requirement of VCI. Moreover, besides basic facilities and equipments, following state of art instruments and equipments related to Molecular genetics and Cytogenetics work are also available in the department.

| Sr. No. | Name of the instrument                      | Sr. No. | Name of the instrument        |
|---------|---------------------------------------------|---------|-------------------------------|
| 1       | Microscope with photography attachment      | 9       | Computers                     |
| 2       | Refrigerated Centrifuge and its Accessories | 10      | Stirred Waterbath             |
| 3       | Thermal Cycler (PCR)                        | 11      | Analytical Balance            |
| 4       | Horizontal Laminar Flow                     | 12      | Double Distillation Unit      |
| 5       | CO <sub>2</sub> Incubator with cylinder     | 13      | Deep freeze                   |
| 6       | Real Time PCR                               | 14      | Weighing balance (Analytical) |
| 7       | Gel Documentation System                    | 15      | Vertical gel electrophoresis  |
| 8       | UV Spectrophotometer                        | 16      | Ice flaking machine           |

## **Publications (Books / Research / Extension / Popular Articles/ Leaflets):**

### **A). Lead Papers in National Seminar /Conference/Symposium**

1. **Mamta Janmeda** , Pandya, G. M., Ramani, U. V., Dangar, N. S., Kharadi, V. B. and Brahmkshtri, B. P. (2014). Dairy Animal Breeding Policy and Programme. National conference of Indian Association of Women Veterinarians. pp 35-39.
2. **Mamta Janmeda** and Menaka R. (2014). Gender and Livestock: Opportunities and Challenges. National conference of Indian Association of Women Veterinarians. Pp 88-91.
3. R. Menaka and **Mamta Janmeda**. (2014). Effect of climatic change in human race and other species habitats on our planet. National conference of Indian Association of Women Veterinarians. pp 189-191.

### **B). Research Publications in national / international journals:**

1. G.M. Pandya, C.G. Joshi, D.N. Rank, V.B. Kharadi, B.P. Bramkshtri, P.H. Vataliya, P.M. Desai and J.V. Solanki (2013). Genetic analysis of Production and Reproduction Traits in Surti Buffalo on an Organised Farm. *Indian J. Dairy Sci.* 66(3): 235-242.
2. Pandya, G. M., Ramani, U. V., Janmeda, M., Dangar, N. S., Tyagi, K., Brahmkshtri, B. P. and Kharadi, V. B. (2014). piRNA: Basics and their Association with PIWI proteins. *Current Trends in Biotechnology and Pharmacy.* 8 (3): 303-308.
3. G.M. Pandya, C.G. Joshi, D.N. Rank, V.B. Kharadi, B.P. Bramkshtri, P.H. Vataliya, P.M. Desai and J.V. Solanki (2015). Genetic analysis of Body weight traits of Surti buffalo *Buffalo Bulletin* 34(2): 189 – 195.
4. Yadav, B.L.; Ramani U.; Pandya G. and Brahmkshtri, B. (2015) Study of Leptin Gene Polymorphism In Surti and Jaffarabadi Buffaloes by PCR-RFLP. *Current Trends in Biotechnology and Pharmacy* 9 (2): 151-156
5. Pandya, G. M., Dangar, N. S., Janmeda, M., Gadhvi, Y.S., Brahmkshtri, B. P. and Kharadi, V. B. (2016). Standard Karyotype of Surti Buffalo from an Organized Farm. *International Journal of Science, Environment and Technology* 5(3):1108-1115.
6. Tyagi, K., Brahmkshtri, B. P., Ramani, U. V., Kharadi, V. B., Pandya, G. M., Janmeda, Mamta., Ankuya , K. J., Patel, M. D. and Sorathiya, L.M. (2016). Test day variability in yield and composition of surti and mehsani buffaloes milk at 15 and 60 postpartum. *Veterinary world* 9: 595:600.
7. Mamta Janmeda, Pandya, G. M., Ramani, U. V., Kharadi, V. B., Tyagi, K. K. and Brahmkshtri, B. P. (2016). Copy Number Variations in Livestock: An Overview. *International Journal of Science, Environment and Technology* 5(5):3494-3505.
8. K. K. Sharma, I. H. Kalyani, D. R. Patel and G. M. Pandya (2016). Enumeration Techniques of Newcastle Disease Virus (NDV) for Oncolytic Virotherapy 2 *Journal of Animal Research* 6(5): 905-910
9. Mamta Janmeda, Ramani, U.V., Pandya, G.M., Tyagi, K., Kharadi, V.B., Brahmkshtri, B.P., Jyotishree Bayan and Pawar, V.D. (2017). Epigenetics: Regulation of Gene expression. *International Journal of Science, Environment and Technology* 6(2): 1390 – 1396.
10. Janmeda M, Kharadi V, Pandya G, Brahmkshtri B, Ramani U, Tyagi K (2017) Relative gene expression of fatty acid synthesis genes at 60 days postpartum in bovine mammary epithelial cells of Surti and Jafarabadi buffaloes *Veterinary World* 10(5): 467-476.

11. Mamta Janmeda, Vishnu Kharadi, Gaurav Pandya, Balkrushna Brahmkshtri, Umed Ramani and Kuldeep Tyagi (2017). Variation in Test Day Milk Yield and Composition at Day 15 and 60 Postpartum in Surti and Jafarabadi Buffaloes. *Journal of Animal Research* 7(3): 451-458.

#### **B). Popular articles:**

1. Mamta Janmeda. Dangar N.S., Pandya G.M., and Kharadi V. B. (2013). Effect of summer and its management in Dairy Animals. *The Indian Cow* **38**: 19 - 22.
2. Mamta Janmeda. Pandya G.M., Dangar N.S and Kharadi V. B. (2014). Congenital Defects in Cattle. *Indian Farmer* **1(1)**: 15-18.
3. Mamta Janmeda. (2014). Application of Biotechnological Tools to Animal Breeding. *Indian Farmer* **1(1)**: 23-27.
4. Dangar N.S., Pandya G.M., Mamta Janmeda and Padheriya Y. (2014). Management of livestock during flood. *Indian Farmer* **1(2)**: 85-87.
5. Mamta Janmeda (2014). Management of Livestock in Drought. *The Indian Cow* **40**: 9-13.
6. Mamta Janmeda. (2015). Increasing Role of Kisan Credit Card. *Indian Farmer* **2(3)**: 194-196.

#### **C). Gujarati articles:**

૧. ડૉ. ગૌરવ પંડયા “પશુપાલનમાં રેકોર્ડ રાખવાનું મહત્વ”. ગોદર્શન -ગાઈડ. મે-૨૦૧૩.
૨. ડૉ. ભાવેશ ત્રાંગડિયા, ડૉ.વિપુલ આર.પટેલ, ડૉ. ગૌરવ પંડયા, ડૉ.યુ.વી.રામાણી, ડૉ.સી.વી.સાવલિયા. “ઝીગામાં જોવા મળતો સફેદ સ્પોટ સિન્ડ્રોમનો રોગ”. કૃષિ વિશ્વ સમાચાર. મે-૨૦૧૩.
૩. ડૉ. ગૌરવ પંડયા ડૉ. ભાવેશ ત્રાંગડિયા, ડૉ.વિપુલ આર.પટેલ, ડૉ.યુ.વી.રામાણી. “દૂધાળા પશુની પસંદગી વખતે ધ્યાનમાં રાખવાના મુદ્દાઓ” કૃષિ-પશુ દર્શન. મે-૨૦૧૩.
૪. જી. એમ. પંડયા, મમતા જનમેદા, યુ. વી. રામાણી અને બી. પી. બ્રહ્મક્ષત્રી (૨૦૧૫). ગુજરાતની પશુ સંવર્ધન નિતી અંગેની ખેડૂતલક્ષી બાબતો. આદર્શ પશુપાલન અને મત્સ્ય પાલન કૃષિ મહોત્સવ બુકલેટ : ૧૮ \_ ૨૧
૫. જી. એમ. પંડયા, યોગેશ પટેરીયા અને વી. બી. ખરાદી (૨૦૧૫). નર પશુની પસંદગી અગત્ય અને પ્રક્રિયા. કૃષિ મહોત્સવ બુકલેટ : ૨૨ - ૨૫.
૬. યુ. વી. રામાણી, એન. એસ. ડાંગર અને બી. પી. બ્રહ્મક્ષત્રી (૨૦૧૫). પશુઓમાં જોવા મળતી જન્મજાત જનિનીક ખોડ ખાંપણ. કૃષિ મહોત્સવ બુકલેટ : ૩૦ - ૩૩.
૭. પી. ડી. વિહોલ, જે. એમ. પટેલ અને બી. પી. બ્રહ્મક્ષત્રી (૨૦૧૫). પશુઓમાં થતા રોગો અને તેને અટકાવવાના ઉપાયો. કૃષિ મહોત્સવ બુકલેટ : ૪૫ - ૪૭.

#### **Awards / Achievements:**

- Dr. Mamta Janmeda, Asst. Professor, has undergone a three months International training programme at Texas A & M University, Texas, USA during May 6- Aug 3, 2013.
- Best paper award for the research paper “Analysis of Chromosomal Abnormalities by Advanced Molecular Cytogenetics” by Mamta Janmeda, Bhanu Chowdhary, Terje

Raudsepp and Sharmila Ghosh., in National Seminar during August 26 -28, 2014 at Anand, Gujarat.

- Best poster award for the research paper “Study of Leptin Gene Polymorphism in Surti and Jaffarabadi Buffaloes by PCR-RFLP” by Yadav, B.L., Ramani U., Pandya G. and Brahmkshtri, B.P. in National Seminar during October 09-11, 2014 at Navsari, Gujarat.
- Best poster award for the research paper “Copy Number Variation Analysis in Goat Genome” by Mamta Janmeda, Bhanu Chowdhary, Terje Raudsepp and Sharmila Ghosh in National Seminar during October 09-11, 2014 at Navsari, Gujarat.
- Best poster award for the research paper “Relative gene expression of fatty acid synthesis genes at 60 day postpartum in bovine mammary epithelial cells of Surti and Jafarabadi buffaloes” by Mamta Janmeda, Vishnu Kharadi, Gaurav Pandya, Balkrishna Brahmkshtri, Umed Ramani and Kuldeep Tyagi in National Symposium during February, 08-10, 2017 at College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala.
- Best Oral Presentation Award for the research paper “Relative Gene Expression Analysis of  $\beta$ -casein milk protein gene and its transcription regulatory genes at two stages of lactation in Jafrabadi buffaloes” by Gaurav Pandya, Umed Ramani, Mamta Janmeda, Vishnu Kharadi, Balkrushna Brahmkshtri, Nikhil Dangar, Kuldeep Tyagi and P. U. Gajbhiye in National Seminar and V<sup>th</sup> Annual Convention of Society for Veterinary Sciences and Biotechnology (SVSBT) during September 22 – 23, 2017 held at College of Veterinary Science and Animal Husbandry of Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa.
- Best Oral Presentation Award for the research paper “Growth Hormone Polymorphism in Surti and Mehsani Goats by PCR-RFLP” by Jyotishree Bayan, Vishnu Kharadi, Umed Ramani, Mamta Janmeda, Gaurav Pandya, Balkrushna Brahmkshtri, Nikhil Dangar, and Kuldeep Tyagi in National Seminar and V<sup>th</sup> Annual Convention of Society for Veterinary Sciences and Biotechnology (SVSBT) during September 22 – 23, 2017 held at College of Veterinary Science and Animal Husbandry of Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa.