



25th ANNUAL REPORT 2013-14



TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY

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PREFACE



Animal Husbandry sector plays a vital role in ensuring the welfare of rural population. A majority of farmers depend on Animal Husbandry for their livelihood. Moreover, Livestock sector provides supplementary employment and sustainable source of income to many small and marginal farmers. Thus, this sector is emerging as an important sector, leveraging the rural economy. In addition, this sector provides a continuous flow of essential food products like milk, meat, eggs besides draught power, raw materials like wool and hide for industries and manure. With increase in production of livestock products, livestock rearing is also considered as an avocation with high export potential.

As a component of agricultural sector, Animal Husbandry sector contributes 3.92% to Gross Domestic Product (GDP) (National Dairy Development Board) and employs 5.5% of the labour force. In recent years, livestock output has grown at a rate of around 4-5% a year. The contribution of livestock sector to the Gross State Domestic Product (GSDP) is 3.93% and that to the agriculture and allied activities is 40.99%. The State contributes 5.29% of milk production, 17.10% of egg production and 8.80% of total meat production (including poultry meat) and ranked 9th in milk production, 2nd in egg production and 5th in meat production in the country.

With the goal of sustaining and further improving the production of livestock products, Tamil Nadu Veterinary and Animal Sciences University supports comprehensive veterinary assistance and health cover to all livestock and poultry across the State by producing quality veterinarians. It also extends need based extension activities through its extension outlets and thereby improves the socio-economic status of farming community. This 25th year of TANUVAS has witnessed a number of land mark events towards developing policies, establishing facilities and improving skills. Notable among them are:

- Three Veterinary University Training and Research Centres at Ramanathapuram, Perambalur and Nagapattinam districts were established during 2013-14 at an outlay of ₹ 2.7 crores
- Established "Centre for Stem Cell Research and Regenerative Medicine" first of its kind in the country, with a budget ₹ 6.58 crores
- The Fourth "Regional Livestock and Fisheries Exhibition" was organized by TANUVAS at Villupuram from 20.04.2013 to 22.04.2013.
- TANUVAS had provided training on "milch cow rearing", "Goat rearing" and "Poultry rearing" to 1,41,479 beneficiaries of Tamil Nadu

State Government scheme on “Hon’ble Chief Minister’s Priceless distribution of milch cows/ sheep and goat / poultry to the poor families in rural areas”

This University is committed to collaborative research activities within and outside the country. Such collaborations promote inter-disciplinary approach, capacity building, technology transfer and wider dissemination of research findings.

During the period under report, TANUVAS had continued collaborations and linkages with

several national and international agencies like Indian Council of Agricultural Research; Department of Biotechnology; Department of Science and Technology; National Bureau of Animal Genetics Resources; National Bank for Agriculture and Rural Development; BBSRC, UK ; British Council of India, UK; UKIERI, UK and generated funds to the tune of ₹ 1172.80 lakhs.

Before I conclude, I thank each and every staff of the University for their full support and contributions during its twenty-fifth year of successful existence.

**VICE-CHANCELLOR i/c and
REGISTRAR**

ACKNOWLEDGEMENTS

Tamil Nadu Veterinary and Animal Sciences University, in its attempt to fulfil its mandate of education, research and extension has increased its efforts in the recent past coping up with the growth in this sector, for which the full support of the authorities of the State and Central Governments are gratefully acknowledged. The guidance and the unstinted support from the Board of Management and other statutory committees were of immense help in identifying our goals, prioritize and put into action.

The University is thankful to the Government of Tamil Nadu and Government of India and their departments and agencies viz. Indian Council of Agricultural Research, New Delhi; Department of Biotechnology, New Delhi; Department of Science and Technology, New Delhi; Agricultural and Processed Food Products Export Development Authority, New Delhi; Department of Animal Husbandry, Dairying and Fisheries, GOI, New Delhi; Ministry of Food Processing Industries, New Delhi; Ministry of Agriculture, New Delhi; National Bureau of Animal Genetic Resources, Karnal; National Bank for Agricultural and Rural Development, Mumbai; Other private agencies like Edwards Life Sciences (India) Pvt. Limited, Mumbai; EID Parry (India) Limited, Chennai; M/s. Novus Animal Nutrition (India) Pvt. Ltd., Chennai; The Alembic Pharmaceuticals Ltd., Mumbai; M/s. Orchid Research Laboratories Ltd., Chennai; M/s. Hester Biosciences, Gujarat; ABT Corporation, Bangalore; Pfizer Pharmaceutical Pvt.

Ltd., Mumbai; Yasham Bio-sciences pvt ltd, Mumbai; Advanced Bio-Agro Technologies, Pune; MARS International, Chennai; Kemin Industries South Asia Pvt. Ltd., Chennai; Indian Herbs, Panchkula; Ayurved Ltd., HP; IFPRI, New Delhi; M/s. Avitech Nutrition Private Ltd, Gurgaon, Haryana and International Agencies namely BBSRC, UK; USAID, USA; British Council of India, UK; SEPPIC, France and UKIERI, UK for their financial assistance to the University for undertaking research.

It gives me an immense pleasure to acknowledge the help and co-operation rendered by the officers, teachers, scientists, research fellows, students, technicians, administrative and supporting staff of our university who have helped in the successful and efficient nursing of the University. Thanks are due to them for their dedication and team spirit. The University considers it a duty to thank the livestock and poultry farmers and other stakeholders in Tamil Nadu. The support received by this University from the people of the State and functionaries at various levels will help to sustain this university as a centre of excellence in animal and food sciences education, research and in outreach programmes.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Livestock sector plays a promising role in ensuring the welfare of rural population. The farming community depends on animal husbandry practices not only for their livelihood but also as an alternative to agriculture. Moreover, animal husbandry sector provides supplementary employment and sustainable source of income to many small and marginal farmers. Thus, this sector is emerging as an important sector, leveraging the rural economy. The Government of Tamil Nadu have launched a number of important initiatives in the Animal Husbandry Sector, including the free distribution of milch cows, as well as the goats/sheep and poultry to poor families in rural areas. As a support for the efforts of Government of Tamil Nadu, TANUVAS is taking active part in providing technical guidance to farmers on scientific livestock farming.

Tamil Nadu Veterinary and Animal Sciences University is the leading University in the country in promoting Veterinary and Animal Sciences education and is recognized as an institution having strong faculty for academic and research collaborations in Veterinary and Animal Sciences with 564 scientific and 1193 administrative supporting staff. TANUVAS has six constituent colleges namely Madras Veterinary College, Chennai; Veterinary College and Research Institutes at Namakkal, Orathanadu, Thanjavur and Tirunelveli; College of Food and Dairy Technology, Koduvalli, Chennai and College of Poultry Production and Management, Hosur.

Besides, this university has seven Research Stations for production oriented research; 21 Veterinary University Training and Research Centres, three Farmers Training Centres, three Krishi Vigyan Kendras and one Agricultural Technology Information Centre to carry out the outreach programmes; nine service providing laboratories namely Poultry Disease Diagnostic and Surveillance Laboratory, Avian Disease Diagnostic Laboratory, Animal Feed Analytical and Quality Control Laboratory, Central University Laboratory, Leptospira Diagnostic Laboratory, Pharmacovigilance Laboratory for Animal Feed and Food, Viral Vaccine Laboratory, Bacterial Vaccine

Laboratory and Zoonoses Research Laboratory, to take care of the health needs of livestock and poultry.

Nutritional and Physiological approaches for enhancing reproductive performance in animals; Identification of fertility associated proteins in dog semen and artificial insemination with frozen semen in bitches; Exploiting the potentials of key virulence protein LOA 22 in the development of a diagnostic kit for animal Leptospirosis; Restriction enzyme mediated integration (REMI) as a strategy for generating stable transformants of *Theileria annulata*; Development of Novel Diagnostic Assays for Avian Mycoplasmosis; Autologous platelet rich plasma seeded on biodegradable extra cellular matrix for the regenerative therapy of musculo skeletal disorders of companion animals; Development of novel molecular diagnostics and improved vaccine for Duck plague virus; Proteomic evaluation of milk in bovine tuberculosis for milk based biomarkers; Development of diagnostic tools for porcine Circo virus (PCV2) an emerging pathogen; Development and validation of rapid, cheaper and sensitive method for the diagnosis of viral infections in laboratory animals; Development of entomopathogenic fungal bioformulation for the control of ticks; Development of novel mycotoxin binders for the management for mycotoxicosis in animals and human; Evaluation of resource use efficiency of cumbu napier hybrid grass under drip irrigation; Identification of strategies for enhancing the share of MPCs in milk procurement to increase farmers income; Soil and mineral mapping in farmers field and sensitizing them to improve biomass and to augment livestock productivity; Novel techniques and Farm Gate Tests for udder health and maximization of milk yield; Accelerated feeding of kids to achieve early market age; Estimation of rates and ratios of livestock and poultry by-products in Tamil Nadu; Intensive fodder production technology for augmenting livestock production; Mapping aflatoxin contaminated maize value chain and implications on poultry sector of Tamil Nadu; Trilateral research partnership initiative for capacity building and student exchange in influenza virus research; Development and delivery of online e-courses for continuous professional development programmes

in Veterinary and Animal Sciences and Studies on the safety and efficacy of poultry vaccines (Fowl Cholera and Infectious Bronchitis) using modern adjuvants are some of the research programmes aimed at augmenting livestock and poultry production.

1. EDUCATION

1.1 Academic programmes

To keep pace with the future challenges and relevance to changing needs and aspirations, our educational system has frequent evaluations and updation of course curricula and teaching methodologies. In the recent past, the University has taken various steps to improve the quality of teaching through various approaches. It is worthwhile to mention here that with the financial assistance from ICAR., New Delhi under National Agricultural Innovation Project, TANUVAS has developed e-courses for B.V.Sc. & A.H., and B.F.Sc. students for online access.

The University offers three undergraduate degree courses besides 28 Masters and 22 Doctoral degree programmes, apart from MSc in Bioinformatics, MPhil in Biotechnology and PG diplomas in Bioinformatics, Companion Animal Practice, Veterinary Laboratory diagnostic techniques, Wild Animal Disease Management, Business Management in Animal and Fisheries Science and Diversified Poultry Production. The overall admission capacity of students in the university is 618. B.V.Sc. & A.H. – 280; B. Tech. in Food Processing Technology - 20; B. Tech. in Poultry Production Technology - 20; M.V.Sc. - 121; M. Tech. - 5; Ph.D. (Veterinary) - 98; Ph.D. (Food Technology) - 3; M.Phil. in Biotechnology - 8; M.Sc. Bioinformatics - 3; PG Diploma in Bioinformatics - 6; PG Diploma in Companion Animal Practice - 4; PG Diploma in Veterinary Laboratory Diagnostic Technique - 6; PG Diploma in Wild Animal Disease Management-6; PG Diploma in Business Management in Animal and Fisheries Science - 8; PG Diploma in Diversified Poultry Production - 30.

1.2 Scholarships

This University is extending monetary assistance to the students to pursue their undergraduate and postgraduate programmes. During the reporting period, 1370 students were awarded scholarships to the tune of ₹ 160.46 lakhs.

1.3 Endowments

Various endowments are instituted by State Government, philanthropists, intellectuals, academicians and animal lovers to motivate the students and staff of TANUVAS to excel in their performance and contribute significantly to the academic and research activities of the University. With the addition of four endowments instituted during the reporting period, a total of 144 endowments are available in this University.

1.4 Student Amenities

To shape the career and in order to expand the wisdom and vision of students by acquiring knowledge in various vistas of Animal and Food Sciences, the following student-friendly facilities are provided.

1.4.1 Library

The libraries at all the constituent colleges of TANUVAS have a good collection of books and journals. Madras Veterinary College library, one of the well equipped libraries in India, has been completely modernized, automated and digitized. In addition, CD-ROM databases have been procured and used for information retrieval. A video library is functioning with 196 video lessons for use by the students and staff.

1.4.2 Computer Centre

The Computer Centre and the Internet Kiosk attached to the Department of Animal Husbandry Statistics and Computer Applications of Madras Veterinary College provide a comprehensive computing, browsing and e-mailing facilities and networking infrastructure to improve learning among students, teaching efficiency and research capability among faculty members. The UG and PG students are given hands-on training in computer applications.

1.4.3 Bioinformatics Centre

Realising the growing needs of information for large spectrum of scientists working in different areas of Biotechnology at R&D centres, Universities and Industrial corporations, this centre sponsored by Department of Biotechnology (BTIS) is functioning at TANUVAS. This centre not only provides offline and online information retrieval service to research

scholars and scientists of TANUVAS but also to the scientists/research scholars of other States.

1.4.4 University Students Counseling and Placement cell

To create and enhance career opportunities to Veterinary and Food Sciences graduates, a separate "University Students Counseling and Placement cell" has been established in the University. This cell maintains a computerised database of veterinary and Food Sciences graduates and postgraduates. With the help of this database, the Cell provides a list graduates/postgraduates to the recruiting agencies for employment opportunities. During the reporting period, 74 Veterinary Graduates got their employment in projects at TANUVAS and other private organisations through this cell.

1.5 Student Activities

This University fosters leadership quality, competitive spirit, co-operation and unity among student community besides guiding them in their academic pursuits through National Cadet Corp (NCC), National Service Scheme (NSS), and Wild Life Club etc. During the year 2013-2014, eight NSS special camps have been conducted in eight NSS adopted villages.

1.6 Faculty Development

For continuing education of TANUVAS faculty, 104 Summer Institutes / Trainings / Seminars / Workshops were conducted. Further, 254 faculty members were deputed to various Summer Institutes/ Workshops, Symposia, Seminars etc. within and outside the country. Apart from this, the University has provided orientation programmes for the new faculty members, management training for senior faculty and administrative training for non-teaching staff.

2. RESEARCH

During the reporting period, the university has bagged 40 new research projects to the tune of ₹ 1172.80 lakhs funded by Government of Tamil Nadu, Indian Council of Agricultural Research, Department of Biotechnology, Department of Science and Technology, Department of Agricultural and Animal Husbandry, Ministry of Food Processing Industries, New Delhi and National Bank for

Agricultural and Rural Development, Mumbai. With these, 137 sponsored research programmes are being implemented at present with a total budget of ₹ 9,924.92 lakhs.

In addition, 70 plan schemes with a financial outlay of ₹ 9694.94 lakhs, funded exclusively by Govt. of Tamil Nadu are being pursued during the period under report.

2.1 Collaboration and Linkages

- ✎ TANUVAS has 30 research programmes to the tune of ₹ 2253.14 lakhs funded by ICAR.
- ✎ It has established linkages with DBT (20); DST (14); Agricultural and Processed Food Products Export Development Authority (2); Department of Animal Husbandry, Dairying and Fisheries (2); Ministry of Food Processing Industries (5); Ministry of Agriculture, New Delhi (4); National Bureau of Animal Genetic Resources, Karnal (2) and National Bank for Agricultural and Rural Development (3) with a total outlay of ₹ 5,240.06 lakhs
- ✎ It has 30 projects to a total outlay of ₹ 1992.79 lakhs from Tamil Nadu State Council for Science and Technology, Tamil Nadu Livestock Development Agency, Tamil Nadu State Land Use Board, Department of Animal Husbandry, Dairying and Fisheries, State Planning Commission and National Agricultural Development Programme.
- ✎ Private agencies viz. Edwards Life Sciences (India) Pvt. Limited, Mumbai; EID Parry (India) Limited, Chennai; M/s. Novus Animal Nutrition (India) Pvt. Ltd., Chennai; The Alembic Pharmaceuticals Ltd., Mumbai; M/s. Orchid Research Laboratories Ltd., Chennai; M/s. Hester Biosciences, Gujarat; ABT Corporation, Bangalore; Pfizer Pharmaceutical Pvt. Ltd., Mumbai; Yasham Bio-sciences Pvt. Ltd, Mumbai; Advanced Bio-Agro Technologies, Pune; MARS International, Chennai; Kemin Industries South Asia Pvt. Ltd., Chennai; Indian Herbs, Panchkula; Ayurvet Ltd., HP; IFPRI, New Delhi and M/s. Avitech Nutrition Private Ltd, Gurgaon, Haryana have funded ₹ 86.76 lakhs for 17 research programmes
- ✎ It has collaboration with international agencies viz BBSRC, UK; USAID, USA; British Council of India, UK; SEPPIC, France and UKIERI, UK and earned eight projects to the tune of ₹ 352.17 lakhs

2.2 SALIENT RESEARCH ACHIEVEMENTS IN ANIMAL SCIENCES

2.2.1 ANIMAL HEALTH

- ◆ **Development and evaluation of indirect ELISA for assessing classical swine fever virus (CSFV) antibodies in pigs**

Using the recombinant CSFV E2 protein, an indirect ELISA was optimized with a coating antigen concentration of 700 ng per well. Plate ELISA was optimized and compared with commercial kit and could be used as an alternative to the commercial kit

- ◆ **Semiochemical sustained release device for the control of ticks**

Calcium alginate beads with assembly pheromone and deltamethrin found to attract all three stages of dog tick and showed 100 per cent mortality in 24 hours post-exposure. Sustained release porous calcium alginate micro particles with attractant sex pheromone (ASP) and tulsi oil found to be highly effective in the environmental control of R. microplus ticks

- ◆ **Development of an inactivated classical swine fever virus (CSFV) vaccine**

An inactivated vaccine has been developed for classical swine fever virus. This vaccine is a cell culture based vaccine, inactivated by BEI with montanide ISA 25 G as adjuvant. The vaccine was found to be protective upto a period for 12 months and withstood challenge with virulent CSFV.

2.2.2 ANIMAL PRODUCTION

- ◆ **Study of fenugreek extract as poultry feed supplement / ingredient**

In broilers, fenugreek residue can be fed up to 2% without affecting productivity and yield of edible parts with better field efficiency. In layer, fenugreek can be fed up to 2% without affecting production with better feed efficiency and egg qualities.

- ◆ **Development of microencapsulated iron fortified yoghurt**

Microencapsulated whey protein chelated iron can be incorporated up to a level of 80 mg per litre of yoghurt without altering the accepted appearance and taste, which can contribute to

alleviating iron deficiency but requires scaling up, quality control and distribution through normal trade channels to have a sustainable impact.

- ◆ **Efficiency of different estrus detection techniques in buffaloes in an organized farm**

Different methods of heat identification in buffaloes were compared in an organised farm. Heat symptoms, vaginal smear examination, vaginal scope examination and camera method were included in the study. Among the techniques studied, behavioural science clubbed with vaginal smear examination were considered to be ideal methods of heat identification in buffaloes.

- ◆ **Optimization of cattle manure treatment techniques for improving manurial value for fodder production**

Out of four manure treatment techniques evaluated, improved and vermi compost methods were found to be better in terms of manure nutrient value, soil carbon sequestration and yield of fodder crops.

2.2.3 Food Sciences

- ◆ **Process optimization and shelf life study of retort processed milk beverages**

Shelf life study of flavored milk indicated that it could be used for 90 days without affecting sensory quality.

- ◆ **Development of millet based icecream**

Milk from kodo, pearl, foxtail and sorghum was mixed with varying quantities of buffalo milk for ice-cream preparation. The millet milk incorporated ice-cream showed lower carbohydrate (57.65%) and milk fat (0.5%) contents whereas the protein content was found to be 4.54%.

2.3 Technologies developed

New Vaccines / Products and technologies / Diagnostic kits developed at TANUVAS are listed below :

Products and technologies developed

ICAR TANUVAS Chickuree; Retort Processed Chicken Products; Artificial Cloaca for Emu; Low cost chaff cutter ; TANUVAS-URF- "Tattoo

hammer for pigs"; TANUVAS-URF-"Low cost automatic waterer for livestock"; Fodder harvester cum chopper; Technology on Bio diesel production from rendered chicken fat; TANUVAS- Goat ES - An user friendly microcomputer based expert system on goat Husbandry practices and TANUVAS - Dairy Farming Technology Display Aids Kit

Diagnostic Kits

Lateral flow kit for diagnosis of bovine brucellosis; Multiplex PCR kit for detection of avian oncogenic viruses; Rapid test kit for rabies virus antibody screening; Lateral flow strip kit for classical swine fever antigen detection

Vaccines

Inactivated leptospira vaccine for bovines

3. CLINICAL ACTIVITIES

TANUVAS offered clinical services through Veterinary Teaching Hospital, Emergency Critical Care Unit, Centralised Clinical Laboratory at Madras Veterinary College, Peripheral Veterinary Hospital at Madhavaram, Veterinary Teaching Hospitals at Veterinary College and Research Institute, Namakkal; VC&RI, Orathanadu and VC&RI, Tirunelveli. A total of 1,36,626 cases were treated during 2013-14.

4 EXTENSION

4.1 Rural Information Technology initiative

TANUVAS has established nine Village Information Centres viz. three centres at Kuzhumani (Tiruchirapalli), Puthuthamaraipatti (Madurai), Chitteri (Vellore) with support from International Development Research Centre (IDRC), Canada and with assistance from UNESCO, six centres at Aminjikarai and Pallikaranai of Chennai District, Kancheepuram and Rail Nagar of Kancheepuram District, Varakkalpattu and Kandarvakottai of Cuddalore District. All these nine centres are equipped with computer, printer, audio, video and electronic information tools for accessing information on animal husbandry and allied activities. These centres are functioning at community buildings for public access and managed by Village Committees.

4.2 Distance Education

TANUVAS offers 21 PG diploma courses for the Veterinaries to update their skills on latest technologies in veterinary field. Apart from this, 22 Certificate courses; 15 skill development courses and 11 self-employment courses in various animal husbandry practices are being offered to booster livestock and poultry production thereby enhancing the rural income through livestock activities. During the reporting period, a total of 823 persons enrolled for the above courses.

4.3 Other outreach activities

The University has organised 3215 training programmes, 219 Exhibitions cum Mass Contact Programmes, 78,604 disease investigation services, 2,52,903 consultancy and other advises benefiting 7,66,495 farmers, and extended health care services by treating 1,23,947 animals including testing of specimens/ samples, vaccination and infertility.

5. Awards and recognitions

Scientists and students of TANUVAS have received wide recognition for their outstanding contribution in the field of veterinary and basic sciences and food sciences. Dr. B.V. Rao Poultry/WPC' 96 Research Grant Award; Fellowship of Indian Dairy Association; Maruthamuthu Mariyae Award; Life time achievement award; Fellow of ISVIB 2013; Best Companion Animal Pathologist; Best Poultry Pathologist; TANSa - 2012 for Veterinary Science; Rashtriya Vidya Gaurav Gold Medal; Rajiv Gandhi Excellence Award; National fellow of Indian Society of Animal Production and Management; Fellowship Society of Toxicology; Dr.P.D.Sethi Annual Award-2012; Bharatshiksha Ratan are a few of the notable awards received by our faculty.

6. Publications

During the period under report TANUVAS faculty members have published 543 research articles in different journals; 549 popular articles in different print media for the benefit of the farmers and public and 35 books / manuals.

INTRODUCTION



1. INTRODUCTION

HISTORICAL PERSPECTIVE

Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), the first of its kind for Veterinary Science in South East Asia was established in the year, 1989. Madras Veterinary College, the premier institute was started in the year 1903 and is the oldest constituent college of TANUVAS. Veterinary College and Research Institute, Namakkal was established in 1985. TANUVAS now has six constituent colleges and other peripheral units to provide teaching, research, extension and development support to Veterinary, Food and Basic Sciences programmes with a national outlook and regional focus. Over the years, TANUVAS has gained prominence as one of the top ranking teaching and research organization in the country, with an international acclaim. The University has collaborative teaching, research and extension programmes with national and international universities and institutes. The research and developmental logistics available for the various activities are the hallmark of TANUVAS which has the following mandates:

- ◆ To impart quality education to undergraduate, post-graduate and doctoral students in different fields of Veterinary and Animal Sciences and Food Sciences
- ◆ To carry out research in livestock and poultry production, protection and value addition of products
- ◆ To disseminate knowledge on important technologies to line departments and farming community for the sustenance and growth of livestock and poultry in the State through extension programmes

HIGHLIGHTS OF THE YEAR 2013-14

- ❖ Honourable Chief Minister of Tamil Nadu announced the establishment of “Stem Cell Research Centre for Animals”, the first of its kind in the country on 06.05.2013 in the Tamil Nadu Legislative Assembly.
- ❖ Thiru T.K.M.Chinnayya, Hon’ble Minister for Animal Husbandry, Government of Tamil Nadu



inaugurated the newly installed Touch Screen Information Kiosk at the newly established Veterinary University Training and Research Centre, Villupuram for the benefit of the farming community.

- ❖ Three more Veterinary University Training and Research Centres have been established at Ramanathapuram, Perambalur and Nagapattinam during 2013 to carryout the extension activities.
- ❖ The Fourth “Regional Livestock and Fisheries Exhibition” was organized by TANUVAS at Villupuram from 20.04.2013 to 22.04.13. More than 15,000 farmers visited the exhibition.



- ❖ Tamil version of veterinary books for second semester of BVSc & AH was released by Dr.R.Prabakaran, the then Vice-Chancellor of TANUVAS



- ❖ International symposium on “Dairy Value Chain” was jointly organized by TANUVAS, Lilongwe University for Agriculture and Natural Resources (LUANAR), Malawi and Michigan State University, East Lansing, USA at Madras Veterinary College on 23.06.2013 and 24.06.2013. Dr. R. Palaniswamy, I.A.S., Director of Animal Husbandry and Veterinary Services, Government of Tamil Nadu inaugurated the programme and released the souvenir.



- ❖ As a part of the on-going UK-India collaborative project on “Monitoring and intervention strategies for bluetongue virus epidemics in rural India” funded by the Biotechnology and Biological



Sciences Research Council, UK, an international training programme on “Bluetongue vector identification” was organised for five days from 01.07.2013 to 05.07.2013 at Vaccine Research Centre – Viral Vaccines, MMC, Chennai.

- ❖ The Fifth International Clinical case conference on “Farm and Companion Animal Practice for Veterinary Students” was jointly organized by TANUVAS, Michigan State University, USA and Virginia-Maryland Regional College of Veterinary Medicine, USA at Madras Veterinary College, Chennai on 09.07.2013 and 10.07.2013.



During the inaugural function of the conference, Thiru T.K.M.Chinnayya, Hon'ble Minister for Animal Husbandry, Government of Tamil Nadu released TANUVAS Technical Reporter.

- ❖ Under the TANUVAS collaborative project on “Trilateral Research in Partnership” with University of Nottingham, England, Virginia Polytechnic Institute and State University, USA and “United Kingdom India Education and Research Initiative”, an International Conference on “Emerging and Transboundary diseases of global importance” was organized at Madras Veterinary College, Chennai on 15.07.2013 and 16.07.2013. Dr.C.Renukprasad, Vice-Chancellor, Karnataka Veterinary, Animal and





Fishery Sciences University, Bidar inaugurated the programme. A total of 189 participants attended the conference. A post conference 'Farmers meet' was organized on 17.07.2013 in which 52 farmers, representatives from Industry and subject matter specialists from India, UK and USA participated.



- ❖ A three days International Workshop on "Avian Diseases" was conducted at the Department of Veterinary Pathology, VC&RI, Namakkal from 05.08.2013 to 07.08.2013. A total of 29 poultry practicing veterinarians and 28 avian disease researchers participated.

- ❖ TANUVAS celebrated World Food Day as "Food Fiesta 13" at College of Food and Dairy Technology, Koduvalli by organizing an inter-collegiate food competition and a one day National workshop on "Sustainable food systems for food security and nutrition" on 23.10.2013.



- ❖ Scientific Workers Conference held at MVC on 12.08.2013 was inaugurated by Dr.R.Prabakaran, the Vice-Chancellor, TANUVAS and released the book entitled "A document on TANUVAS technologies" and "Interactive CD" containing the technologies released by TANUVAS.

- ❖ A brainstorming meeting on "Canine Health" sponsored by the Department of Biotechnology, Government of India was organized on 29.11.2013 at MVC, Chennai. Dr. S.R. Rao, advisor, Department of Biotechnology, Government of India, New Delhi chaired the meeting and 42 scientists from all over the country participated.



- ❖ The Sixteenth Convocation of TANUVAS was held at Anna Auditorium, MVC, on 10.09.2013. His Excellency, Dr. K. Rosaiah, the Governor of Tamil Nadu and the Chancellor of TANUVAS, presided and conferred degrees to 300 candidates.

- ❖ A Memorandum of Understanding was signed between TANUVAS and Universitat Autònoma de Barcelona, Barcelona, Spain on 08.10.2013. This will facilitate to develop research and teaching activities common to both the universities.



- ❖ A Memorandum of Understanding was signed between TANUVAS and School of Medicine, University of Glasgow, England for reciprocity of exchanging scholars, students, appropriate academic resources and materials to enhance research and education process in both the institutions at TANUVAS on 11.12.2013.
- ❖ A Memorandum of Understanding was signed between TANUVAS and the University of Nottingham, United Kingdom on 06.01.2014 to strengthen the academic cooperation between both the institutions and also for the reciprocal exchange of students and faculties, documentation and research materials.



ORGANISATIONAL SET- UP

The organisational structure of TANUVAS follows the pattern of State Agriculture Universities. Policy making of TANUVAS are managed through different bodies constituted for the purpose of education, research and extension activities as given below:

- Board of Management
- Planning Board
- Academic Council
- Finance Committee
- Research Council
- Extension Education Council
- Board of Studies

The **Board of Management** is the highest policy making body. The **Planning Board** of the University shall advise on the planning and development of the University and review the standard of education and research in the University. The **Academic Council** shall be the academic authority of the University and have the control and general regulation of teaching and examination in the University and responsible for the maintenance of the standards prescribed. The **Finance Committee** governs the finance and accounts

of the University. The Research Council will be the policy making body of the University research. The **Extension Education Council** formulates the policies and broad outline of extension education activities to be carried out by the University in cooperation with the concerned line and government departments. The **Board of Studies** of the respective faculties will frame curricula for undergraduate and postgraduate programmes; recommend to the Academic Council the establishment of new departments, abolition / sub-division / or otherwise reconstitution of the existing departments.

Teaching, research and extension activities of the University are managed by the Vice-Chancellor with the assistance of Registrar, Finance Officer, Controller of Examinations, Estate Officer, Deans of Colleges, Directors of Research, Animal Health, Animal Production, Extension Education, Distance Education and Clinics. Various committees and cells like Hospital Management Committee, Livestock Production Committee, Animal Disease Review Committee, Building Committee, Grievances Committee, Sports Committee, Research Project Monitoring and Evaluation cell and Product Development and Commercialization Cell are also functional.

**OFFICERS OF THE UNIVERSITY**

Chancellor	His Excellency Dr. K. Rosaiah Governor of Tamil Nadu
Pro-Chancellor	Thiru T.K.M. Chinnayya Hon'ble Minister for Animal Husbandry, Government of Tamil Nadu
Vice-Chancellor	Dr. R. Prabakaran (up to 18.10.2013 AN) Dr. T.J. Harikrishnan (i/c from 18.10.2013 AN)
Registrar	Dr. C. Balachandran (upto 31.05.2013 AN) Dr. C. Balachandran (i/c from 31.05.2013 AN to 19.06.2013 AN) Dr. K. Kumanan (i/c from 19.06.2013 AN to 22.06.2013 FN) Dr. T.J. Harikrishnan (from 22.06.2013 FN)
Controller of Examinations	Dr. M. Thirunavukkarasu
Dean, Madras Veterinary College	Dr. S.A. Asokan
Dean, Faculty of Basic Sciences	Dr. K. Saravanabava (upto 14.07.2013 AN) Dr. S.A. Asokan (i/c from 15.07.2013 FN)
Dean Veterinary College and Research Institute, Namakkal	Dr. K.A. Doraisamy
Dean Veterinary College and Research Institute, Tirunelveli	Dr. S. Prathaban
Dean Veterinary College and Research Institute, Orathanadu, Thanjavur	Dr. C. Veerapandian
Dean, Faculty of Food Sciences	Dr. T. Sivakumar
Director of Research	Dr. K. Kumanan (upto 19.06.2013 AN) Dr. C. Balachandran (i/c from 19.06.2013 AN to 22.06.2013 AN) Dr. K. Kumanan (from 22.06.2013 AN)
Director of Clinics	Dr. S.R. Srinivasan
Director Centre for Animal Production Studies	Dr. M. Babu
Director Centre for Animal Health Studies	Dr. V. Purushothaman (upto 31.05.2013 AN) Dr. V. Purushothaman (i/c from 31.05.2013 AN to 31.08.2013 AN) Dr. K. Kumanan (i/c from 01.09.2013 FN)
Director of Extension Education	Dr. C. Chandrahasan
Director of Distance Education	Dr. D. Thyagarajan
Director, College of Poultry Production and Management	Dr. M. Murugan
Finance Officer	Tmt. S. Kalavathy (upto 31.05.2013 AN) Dr. K. Kumanan (i/c. from 01.06.2013 FN to 24.06.2013 FN) Thiru V. Sundar (from 24.06.2013 FN)
Estate Officer	Er. K. Ramamoorthy (i/c upto 22.06.2013 FN) Er. K. Ramamoorthy (from 22.06.2013 FN to 09.10.2013 AN) Er. S. Kuppasamy (i/c from 09.10.2013 AN)

BOARD OF MANAGEMENT

(Class-I Ex-officio Members) Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T. J. Harikrishnan (i/c from 18.10.2013 AN)
Member Secretary (Registrar)	Dr. C. Balachandran (upto 31.05.2013 AN) Dr. C. Balachandran (i/c from 31.05.2013 AN to 19.06.2013 AN) Dr. K. Kumanan (i/c from 19.06.2013 AN to 22.06.2013 FN) Dr. T. J. Harikrishnan (from 22.06.2013 FN)
Members	Secretary to Government in-charge of Animal Husbandry, Dairying and Fisheries Secretary to Government in-charge of Finance Secretary to Government in-charge of Law Commissioner of Animal Husbandry and Veterinary Services Commissioner of Fisheries
(Class-II Other Members)	
One Scientist	Dr. K. T. Sampath, Ph.D. (up to 29.04.2013) Dr. V. Venkatasubramanian, Ph.D. (from 02.05.2013)
One Livestock farmer	Thiru R. Gunasekaran
One representative of the industries connected with Animal Husbandry or Fisheries	Dr. V. Ramasamy, Ph.D., (upto 29.04.2013) Dr. CK. Thota (from 02.05.2013)
One women social worker	Tmt. Jaya Arunachalam (upto 29.04.2013) Tmt. Amali Cletus Babu (from 02.05.2013)
One Educationist	Prof. M.P. Yadav (upto 29.04.2013) Th.N. Vishnu Vardhana Rao (from 02.05.2013)
One nominee of ICAR	Dr. Madan Mohan
One nominee of TN Veterinary Council	Dr. D. Ramamurthy
One member (Member of TN Legislative Assembly)	Th. M. K. Ashok, M.L.A.,
Two members representing agriculture and conversant with agriculture matters	Dr. D.V.R. Prakasha Rao, Ph.D. Dr. M. Sundaralingam, B.V.Sc.



ACADEMIC COUNCIL

Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T. J. Harikrishnan (i/c from 18.10.2013 AN)
Member Secretary (Registrar)	Dr. C. Balachandran (upto 31.05.2013 AN) Dr. C. Balachandran (i/c from 31.05.2013 AN to 19.06.2013 AN) Dr. K. Kumanan (i/c from 19.06.2013 AN to 22.06.2013 FN) Dr. T.J. Harikrishnan (from 22.06.2013 FN)
(Class-I Ex-officio Members)	
Members	Secretary to Government in-charge of Animal Husbandry, Dairying and Fisheries Commissioner of Animal Husbandry and Veterinary Services
Deans of each college	Dr. S. A. Asokan Dr. T. Sivakumar Dr. K. A. Doraisamy Dr. C. Veerapandian Dr. S. Prathaban
Dean, Faculty of Basic Science	Dr. D. Thyagarajan (In-charge)
Director of Research	Dr. K. Kumanan
Director of Clinics	Dr. S. R. Srinivasan
Director of Extension Education	Dr. C. Chandrahasan
Director of Distance Education	Dr. D. Thyagarajan
Director, Centre for Animal Health Studies	Dr. K. Kumanan (In-charge)
Director, Centre for Animal Production Studies	Dr. M. Babu
Director, College of Poultry Production and Management	Dr. M. Murugan

Class – II Other Members	
(Nominated by the Vice-Chancellor on rotational amongst the Heads of Departments)	<ol style="list-style-type: none"> 1. Dr. P.S. Thirunavukkarasu Professor and Head, Department of Clinics, MVC., Chennai 2. Dr. R. Sridhar Professor and Head, Dept. of Vety. Pathology, VC & RI., Namakkal 3. Dr. N. Ramamurthy Professor and Head, Dept. of Poultry Science, MVC., Chennai 4. Dr. V. Ramesh Saravanakumar Professor and Head, Dept of Livestock Production and Management, VC&RI., Namakkal 5. Dr. J. Johnson Rajeswar Professor and Head, Dept. of Veterinary Microbiology, VC&RI., Tirunelveli 6. Dr. B. Mohan Professor and Head, Poultry Disease Diagnosis and Surveillance Laboratory, Namakkal 7. Dr. N.K. Sudeep Kumar Professor and Head, Dept. of Livestock Business Management, MVC, Chennai 8. Dr. D. Ramasamy Professor and Head, Dept. of Food Sciences and Technology, College of Food and Dairy Technology, Koduvali, Chennai
Persons having special knowledge of practical experience in different aspects of Veterinary and Animal Sciences	<ol style="list-style-type: none"> 1. Dr. T.S. Chandrasekhara Rao Dean, Faculty of Veterinary Science Sri Venkateswara Veterinary University, Tirupathi-517 502 2. Dr. Shivshankar M. Usturge Dean, College of Veterinary Science, Karnataka Veterinary, Animal and Fisheries Sciences University, Nandi Nagar, Bidar, Karnataka 3. Dr. K. Sunilkumar Mohamed Head, Molluscan Fisheries Division, Centre for Marine Fisheries Research Institute, Cochin – 682 108

**PLANNING BOARD**

Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T.J. Harikrishnan (i/c from 18.10.2013 AN)
Secretary (Registrar)	Dr. C. Balachandran (upto 31.05.2013 AN) Dr. C. Balachandran (i/c from 31.05.2013 AN to 19.06.2013 AN) Dr. K. Kumanan (i/c from 19.06.2013 AN to 22.06.2013 FN) Dr. T.J. Harikrishnan (from 22.06.2013 FN)
Members	The Director of Animal Husbandry and Veterinary Services The Director of Fisheries
Persons of high Academic standing nominated by the Board (not more than eight)	<ol style="list-style-type: none"> Dr. S.C. Gupta, Assistant Director General, Indian Council of Agricultural Research, Krishi Bhavan, New Delhi - 110 001. Professor M.P. Yadav, H.No. 365, Sector, 45, Gurgaon, Haryana - 122 003. Dr. P.S. BIRTHAL, Principal Scientist, National Centre for Agricultural Economics and Policy Research (NCAP), P.O.Box.No.11305, D.P.S.Marg, Pusa, Librarian Avenue, New Delhi 110 012 Dr. A.K. Chakravarthy, Principal Scientist Artificial Breeding Research Centre, National Dairy Research Institute, Karnal - 132 001, Haryana Thiru. S. Ranganathan, Poultry Farmer, 5/241/1, N.K.R. Nagar, Mohanur Road, Namakkal-637 001

FINANCE COMMITTEE

Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T.J. Harikrishnan (i/c from 18.10.2013 AN)
Member - Secretary	Finance Officer, TANUVAS
Members (Ex-officio Members)	Secretary to Government, Animal Husbandry, Dairying and Fisheries Secretary to Government, Finance
Board Member (Non-official)	Dr. K.T. Sampath Director, National Institute of Animal Nutrition and Physiology, Adugodi, Bangalore-560 030

RESEARCH COUNCIL

Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T.J. Harikrishnan (i/c from 18.10.2013 AN)
Member Secretary (Director of Research)	Dr. K. Kumanan
Members	Registrar Commissioner of Animal Husbandry and Veterinary Services Commissioner of Fisheries Deans & Directors of TANUVAS Heads of Research Stations Project Co-ordinators
Members (Nominated by Pro-Chancellor) Two Specialist of eminence	Dr. S. Rukmangathan G2C/12, Manchester Square, Puliakulam Road Coimbatore-641 037 Dr. V. Velan Flat No.3, Subhasree Apartments, K22, (Old. No.K.10), First Main, Anna Nagar East, Chennai-600 102
Three progressive farmers in Animal Husbandry / Fisheries	Thiru B. Jeevandas Rai Pragathi Broilers & Farms, Chennai Thiru K.A. Sathiyamoorthy Erode Thiru S. Jeyaraman Salem
Members (Nominated by Vice-Chancellor)	Dr. S.N. Sivaselvam Prof. and Head, Dept. of Animal Genetics and Breeding, MVC., Chennai Dr. M.Subramaniam Prof. and Head, Dept. of Clinical Medicine, Ethics and Jurisprudence, VC & RI., Namakkal Dr. J. Johnson Rajeswar Prof. and Head, Dept. of Veterinary Microbiology, VC & RI., Namakkal Dr. A. Mohammed Safiullah Prof. and Head, Dept. of Animal Husbandry Economics, VC & RI., Orathanadu Dr. S. Suresh Subramonian Professor, CFDT, Koduvalli Dr. A.V. Omprakash Professor and Head, Poultry Research Station, MMC, Chennai



EXTENSION EDUCATION COUNCIL

Chairman (Vice-Chancellor)	Dr. R. Prabakaran (upto 18.10.2013 AN) Dr. T.J. Harikrishnan (i/c from 18.10.2013 AN)
Member Secretary (Director of Extension Education)	Dr. C. Chandrahasan
Members	Registrar Commissioner of Animal Husbandry and Veterinary Services Commissioner of Fisheries Deans & Directors of TANUVAS Three Regional Joint Directors of Animal Husbandry / Fisheries Professors of Extension Education
Members (Nominated by Pro-Chancellor) Three Progressive farmers in Animal Husbandry)	Tmt. V. Latha Suresh Chennai Thiru. S. Ganesh Kamalakannan Thiruvarur Thiru. B. Suryakumar Nagapattinam
Members (Nominated by Vice-Chancellor) Two eminent persons	Dr. S. Baskaran Professor and Head Department of Extension Kerala Agricultural University Kerala Dr. K.A. Ponnusamy Director of Extension Education i/c Tamil Nadu Agricultural University Coimbatore - 641 003
Two Professors from Veterinary faculty	1. Dr. S. Selvam Professor and Head Department of Animal Husbandry Statistics and Computer Applications Madras Veterinary College Chennai - 600 007 2. Dr. V. Balakrishnan Professor and Head Department of Animal Nutrition Madras Veterinary College Chennai - 600 007

BOARD OF STUDIES (VETERINARY FACULTY)

Chairman (Dean, Faculty)	Dr. C. Chandrahasan
Members	Other Deans within the faculty Deans of other faculties All Directors of the University The Senior Heads of Departments of the Teaching Institutes of the concerned faculty
Elected Members One Associate Professor	Dr. P. Devendran
Three Assistant Professors	Dr. A. Arivuchelvan Dr. C. Kathirvelan Dr. R. Saravanan
Nominated External experts (Two experts in the concerned subjects)	Dr. P.C. Saseendran, Professor and Head, Department of Livestock Production and Management, College of Veterinary and Animal Sciences, Mannuthy, Thrissur Dr. L. Ranganath, Professor and Head, Department of Veterinary Surgery and Radiology, Veterinary College KVAFSU, Hebbal, Bangalore

BOARD OF STUDIES (FACULTY OF BASIC SCIENCES)

Chairman (Dean, Faculty of Basic Sciences)	Dr. S. A. Asokan
Members	Other Deans within the faculty Deans of other faculties All Directors of the University and Professor and Head of the Departments of Faculty of Basic sciences
Elected Members Two Associate Professors	Dr. M. Prabu Dr. S. Manoharan
Four Assistant Professors	Dr. V. S. Vadivoo Dr. S. Rathnaprabha Dr. A. Serma Saravana Pandian Dr. C. Vennila
Nominated External experts (Two experts in the concerned subjects)	Dr. S. Karutha Pandian, Ph.D., Professor and Head, Dept. of Biotechnology, Alagappa University, Karaikudi. Dr. Lalith Achoth, Ph.D., Professor and Head, Dept. of Dairy Economics, Dairy Science College, Hebbal, Bangalore



BOARD OF STUDIES (FACULTY OF FOOD SCIENCES)

Chairman (Dean, Faculty of Basic Sciences)	Dr. T. SIVAKUMAR
Members	Other Deans within the faculty Deans of other faculties All Directors of the University and Senior Heads of the Departments of the Faculty of Food sciences
Elected Members Two Associate Professors	Dr. S. Sureshkumar Dr. T. R. Pugazhenth
Four Assistant Professors	Er. V. Perasiriyan Dr. S. Ezhilvelan Dr. P. Selvan Dr. N. Karthikeyan
Nominated External experts (Two experts in the concerned subjects)	Dr. P. Kuttinarayanan Professor and Head Dept. of Livestock Product Technology, College of Veterinary and Animal Sciences, Mannuthy, Kerala – 680 651 Dr. V. Padamanabha Reddy Associate Dean College of Dairy Technology Sri Venkateswara Veterinary University Tirupati – 517 502, Andhra Pradesh

ORGANIZATION OF MEETINGS

Sl. No.	Authorities	Date
1.	BOARD OF MANAGEMENT	23.04.2013 24.08.2013
2.	PLANNING BOARD	26.03.2014
3.	BOARD OF STUDIES (VETERINARY FACULTY)	22.03.2014
4.	BOARD OF STUDIES (FACULTY OF BASIC SCIENCES)	-
5.	BOARD OF STUDIES (FACULTY OF FOOD SCIENCES)	03.03.2014
6.	RESEARCH COUNCIL	12.03.2014
7.	FINANCE COMMITTEE	-
8.	ACADEMIC COUNCIL	05.04.2013 24.08.2013
9.	EXTENSION EDUCATION COUNCIL	20.03.2014





CONSTITUENT UNITS OF THE UNIVERSITY

COLLEGES AND INSTITUTES

Madras Veterinary College (MVC), Chennai
 Veterinary College and Research Institute (VC & RI), Namakkal
 Veterinary College and Research Institute (VC & RI), Thanjavur
 Veterinary College and Research Institute (VC & RI), Tirunelveli
 College of Food and Dairy Technology, Koduvalli
 College of Poultry Production and Management, Hosur

CENTRES OF ADVANCED STUDIES (CAS)

Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai
 Poultry Science, VC & RI, Namakkal

CENTRE OF EXCELLENCE

Centre of Excellence in Animal Biotechnology and Immunology, MVC, Chennai

RESEARCH STATIONS

Poultry Research Station, Madhavaram Milk Colony, Chennai
 TANUVAS Regional Research Centre, Pudukottai
 Post Graduate Research Institute in Animal Sciences, Kattupakkam
 Mecheri Sheep Research Station, Pottaneri
 Sheep Breeding Research Station, Sandynallah
 University Research Farm, Madhavaram Milk Colony, Chennai
 Institute of Animal Nutrition, Kattupakkam

VETERINARY UNIVERSITY TRAINING AND RESEARCH CENTRES (VUTRCs)

Coimbatore	Dharmapuri	Dindigul	Erode	Karur
Madurai	Melmaruvathur	Nagercoil	Cuddalore	Rajapalayam
Salem	Thanjavur	Tiruppur	Tiruchirapalli	Vellore
Villupuram	Krishnagiri	Thiruvannamalai	Ramanathapuram	Nagapattinam
Perambalur				

RESEARCH AND SERVICE LABORATORIES

Poultry Disease Diagnostic and Surveillance Laboratory, Namakkal
 Avian Disease Laboratory, Thalaivasal
 Animal Feed Analytical and Quality Assurance Laboratory, Namakkal
 Pharmacovigilance Laboratory for Animal Feed and Food Safety, Chennai
 Central University Laboratory, Madhavaram Milk Colony, Chennai
 Zoonoses Research Laboratory, Madhavaram Milk Colony, Chennai
 Bacterial Vaccine Research Centre, Madhavaram Milk Colony, Chennai
 Viral Vaccine Research Centre, Madhavaram Milk Colony, Chennai
 Centralised Instrumentation Laboratory, MVC., Chennai
 Centralised Clinical Laboratory, MVC., Chennai
 Central Feed Technology Unit, Kattupakkam

FARMERS TRAINING CENTRES (FTCs)

Kancheepuram Theni Tiruvarur

KRISHI VIGYAN KENDRAS (KVKs)

Kattupakkam Kundrakudi Namakkal

RESEARCH





2. RESEARCH

During 2013-14, a total of 137 research projects with a total outlay of ₹ 9924.92 lakhs sponsored by various funding agencies, were in operation in Veterinary and Animal Sciences, Basic Sciences and Food Sciences faculties. The abstract of the same is furnished below:

RESEARCH PROJECTS IN OPERATION

Sl. No.	Funding Agencies	No. of Projects	Budget (₹ in lakhs)
1	Indian Council of Agricultural Research, New Delhi (25 projects with 100% and 5 projects with 75% ICAR funding)	30	2253.14
2	Department of Biotechnology, New Delhi	20	2922.25
3	Department of Science and Technology, New Delhi	14	460.64
4	Agricultural and Processed Food Products Export Development Authority, New Delhi	2	991.73
5	Department of Animal Husbandry, Dairying and Fisheries, GOI, New Delhi	2	310
6	Ministry of Food Processing Industries, New Delhi	5	413.36
7	Ministry of Agriculture, New Delhi	4	103.12
8	National Bureau of Animal Genetic Resources, Karnal	2	20.85
9	National Bank for Agricultural and Rural Development, Mumbai	3	18.11
10	Government Agencies of Tamil Nadu	18	306.73
11	Government of Tamil Nadu under Part II	5	257.5
12	National Agricultural Development Programme	7	1428.56
13	Other Agencies Edwards Life Sciences (India) Pvt. Limited, Mumbai EID Parry (India) Limited, Chennai M/s. Novus Animal Nutrition (India) Pvt. Ltd., Chennai The Alembic Pharmaceuticals Ltd., Mumbai M/s. Orchid Research Laboratories Ltd., Chennai M/s. Hester Biosciences, Gujarat ABT Corporation, Bangalore Pfizer Pharmaceutical Pvt. Ltd., Mumbai Yasham Bio-sciences pvt ltd, Mumbai Advanced Bio-Agro Technologies, Pune MARS International, Chennai Kemin Industries South Asia Pvt. Ltd., Chennai Indian Herbs, Panchkula Ayurved Ltd., H.P. (2) IFPRI, New Delhi M/s. Avitech Nutrition Private Ltd, Gurgaon, Haryana	17	86.76
14	International Agencies BBSRC, UK USAID, USA British Council of India, UK SEPPIC, FRANCE UKIERI, UK	4 1 1 1 1	309.33 20.96 6.4 2.15 13.33
	Grand Total	137	9924.92



Of the above, the following 37 new projects were sanctioned by different external agencies to the tune of ₹ 957.80 lakhs during 2013-14.

Sl. No.	Title of the scheme	Funding Agency	Budget (₹ in lakhs)
1	Veterinary Ambulatory Clinical Complex and Animal Blood Banking	ICAR (100%)	99.5
2	Nutritional and Physiological approaches for enhancing reproductive performance in animals	ICAR (75%)	152.5
3	Identification of fertility associated proteins in dog semen and artificial insemination with frozen semen in bitches	DBT, GOI, New Delhi	41.14
4	Exploiting the potentials of key virulence protein LOA 22 in the development of a diagnostic kit for animal Leptospirosis		37.22
5	Restriction enzyme mediated integration (REMI) as a strategy for generating stable transformants of <i>Theileria annulata</i>		24.39
6	Development of Novel Diagnostic Assays for Avian Mycoplasmosis		35.35
7	Autologous platelet rich plasma seeded on biodegradable extra cellular matrix for the regenerative therapy of musculo skeletal disorders of companion animals		23.278
8	Development of novel molecular diagnostics and improved vaccine for Duck plague virus		29.17
9	Proteomic evaluation of milk in bovine tuberculosis for milk based biomarkers		50.82
10	Development of diagnostic tools for porcine Circovirus (PCV2) an emerging pathogen	DST, GOI, New Delhi	27.6
11	Development and validation of rapid, cheaper and sensitive method for the diagnosis of viral infections in laboratory animals		24.37
12	Development of entomopathogenic fungal bioformulation for the control of ticks		19
13	Development of novel mycotoxin binders for the management for mycotoxicosis in animals and human		65
14	Surveillance of antibiotic usage and its resistance in bovine mastitis		31.26
15	Conservation of Ramnad white breed of sheep of Tamil Nadu	DAHD&F, MOA, GOI, New Delhi	86.00
16	Establishment of Model Fruit and Vegetable Processing Plant	Ministry of Food Processing Industries, GOI, New Delhi	75.00
17	Entrepreneurship development programme - Demonstration of value added products in fruits, vegetables and millet products		4.00
18	ATMA-Demonstration- Farm School	ATMA (Agriculture)	28.90
19	ATMA- Technology transfer through demonstration and training		0.48
20	Evaluation of resource use efficiency of cumbu napier hybrid grass under drip irrigation	State Planning Commission, Chennai	10.13
21	Identification of strategies for enhancing the share of MPCS in milk procurement to increase farmers income		3.37
22	Soil and mineral mapping in farmers field and sensitizing them to improve biomass and to augment livestock productivity		3.00
23	Novel techniques and Farm Gate Tests for udder health and maximization of milk yield	TNSCST, Chennai	0.50
24	Accelerated feeding of kids to achieve early market age		2.00
25	Demonstration of fruit processing, vegetable carving and preparation of paper cups and paper plates	Directorate of Horticulture, Sivagangai	1.80
26	Establishment of small horticultural nursery		6.25
27	Estimation of rates and ratios of livestock and poultry by-products in Tamil Nadu	Directorate of Economics & Statistics, Chennai	27.00



28	Integrated farming system on sustainable farming	TNSLURB, Chennai	1.58
29	Intensive fodder production technology for augmenting livestock production		2.89
30	To study the efficacy of <i>Bacillus subtilis</i> PB6 in enhancing the performance of commercial layer chicken	Kemin Industries South Asia Pvt. Ltd., Chennai	8.37
31	Study on the efficacy of herbal methionine and herbal lysine supplementation on the performance of broilers	Indian Herbs, Panchkula	3.59
32	Effect of Dietary Herbal Methionone (Methiorep) supplementation on the performance of Large White Yorkshire pigs	Ayurvet Ltd., HP	2.75
33	Mapping aflatoxin contaminated maize value chain and implications on poultry sector of Tamil Nadu	IFPRI, New Delhi	5.00
34	Effect of herbal saponins (SAPODO) as a feed additive on growth performance and ammonia inhibition in commercial broilers	M/s. Avitech Nutrition Private Ltd, Gurgaon, Haryana	2.71
35	Trilateral research partnership initiative for capacity building and student exchange in influenza virus research	UKIERI, UK	13.33
36	Development and delivery of online e-courses for continuous professional development programmes in veterinary and animal sciences	British Council of India, UK	6.40
37	Studies on the safety and efficacy of poultry vaccines (Fowl Cholera and Infectious Bronchitis) using modern adjuvants	SEPPIC, France	2.15
TOTAL			957.80

Apart from 137 Research projects, 70 plan projects with a financial outlay of ₹ 9694.94 lakhs funded by Government of Tamilnadu are also in operation. During this year, the State Government sanctioned 3 projects under Part II at a total cost of ₹ 215.00 lakhs.

Sl. No.	Name of the scheme	Sanctioned under	Amount (₹ in lakhs)
1.	Establishment of elite Murrah buffalo bull mother farm unit at VCRI, Orathanadu	Part II Projects Govt. of Tamil Nadu	30.00
2.	Revitalising health of free milch cows through SMART mineral mixture		150.00
3.	Establishment of poultry hatchery for supplying indigenous / improved germplasm to small scale rural poultry farming		35.00
TOTAL			215.00

RESEARCH COLLABORATIONS

The scientific competence and excellence of the scientists of this University in conducting various research programmes led to fiscal support from various National and International organizations / agencies. The University maintains close liaison with various National and International Institutions / organizations to exchange information and to acquire current and advanced knowledge in Veterinary and Animal Sciences, Basic Sciences and Food Sciences for dissemination.

RESEARCH CO-ORDINATION AND MANAGEMENT

TANUVAS is actively engaged in research activities through different research projects funded by national and international agencies as well as Government

of Tamil Nadu. The Directorate of Research looks into strategic planning of research programmes, establishment of linkages with research organizations at national and international level, research monitoring through internal and external mechanisms and research documentation.

Research Project Approval Committee (RPAC)

Director of Research is the Chairman of the RPAC; the Deans or Directors concerned and one technical expert nominated by the Chairman are the members of the RPAC. The RPAC periodically scrutinizes all the research proposals received and forwards the same to the funding agencies after the approval of the Vice-Chancellor.



During the reporting period, 125 RPAC meetings were conducted, in which 107 projects were approved and sent to various funding agencies for getting financial assistance.

Research Council

The Research Council is the policy making body on research activities of the University with the Vice-Chancellor as its chairman. The Research Council shall consider and make recommendations in respect of :

- Identifying thrust areas and formulation of research programmes and projects by the various university units in the field of Animal and Veterinary Sciences with a view to promote effective cooperation
- Infrastructure facilities required for implementing research projects
- Linking teaching, research, extension education and participation of research workers in teaching and extension education
- Orienting research to meet farmers need
- Analyze the reports of on-going/ completed research projects submitted by the scientists concerned
- Any other matter pertaining to Animal Husbandry/ Veterinary Sciences Research which may be referred by State / Board of Management / Vice-Chancellor or any other authorities of the University/Agencies

The Research Council meets once in a year to identify priorities, approves research programmes of the activity and review the on-going research in the University. During the reporting period, the 23rd Research Council meeting was held on 12th March 2014 at Madras Veterinary College, Chennai. During the meeting, action taken on the recommendations of previous Research Council meeting, new projects sanctioned, reports on completed external funded projects were discussed, plan projects were reviewed and recommended the proposal for further continuance of plan projects. Apart from this, thrust areas for future research were identified.

SPECIAL INITIATIVES

TANUVAS Research Corpus Fund

To motivate young faculty members in active demand driven, field based research, TANUVAS had created TANUVAS Research Corpus Fund (TRCF) during 2012. TANUVAS Task Force Committee (TTFC) was constituted to scrutinize the proposals submitted by the faculties under TRCF. During 2013-14, 20 projects have been sanctioned under TRCF to the total tune of ₹ 41.49 lakhs.

Publication Drive Month

Considering the importance of publishing research papers, TANUVAS is observing the "October" month as "TANUVAS Publication Drive Month". During 2013-14, 388 research papers were sent for publication in peer reviewed journals under the "TANUVAS Publication Drive Month" programme.



Umblachery Cattle



Rajapalayam Dog

RESEARCH HIGHLIGHTS

The background of the slide is a gradient of light blue, transitioning to a darker blue at the bottom. In the lower half, there are several glowing, wavy lines that resemble light trails or data paths, creating a sense of motion and technology.

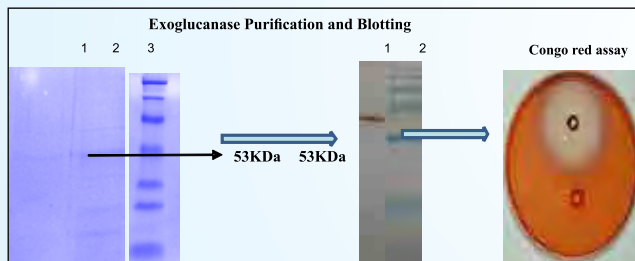


RESEARCH HIGHLIGHTS

Animal Biotechnology

Manipulation of rumen ecosystem through modified rumen microbes encoding novel fibrolytic enzymes using nucleic acid based technologies for the improved utilization of crop residues

- ❖ Cloned and expressed exoglucanase, endoglucanase, lignin peroxidase and manganese peroxidase genes from *Phanerochaete chrysosporium* in to *Saccharomyces cerevisiae*. In vitro trials have been conducted with recombinant *Saccharomyces cerevisiae* having exoglucanase, endoglucanase, manganese peroxidase and lignin peroxidase using Rusitec. There was a 17% increase in the in vitro digestibility with recombinant *Saccharomyces cerevisiae* harbouring exoglucanase genes. *Saccharomyces cerevisiae* harbouring exoglucanase, endoglucanase, manganese peroxidase and lignin peroxidase would be useful in increasing the fibre digestibility under in vivo conditions.



12 % SDS-PAGE analysis of recombinant protein in pYES-DEST induced with 2 % galactose showing purified protein of 53 Kda in 12 hrs culture (arrow)
Lane 1: Eluted Sample 1,
Lane 2: Eluted Sample 2,
Lane 3: Ladder

Western blot analysis showing 53 Kda protein
Lane 1: Induced showing 53 Kda
Lane 2: Marker

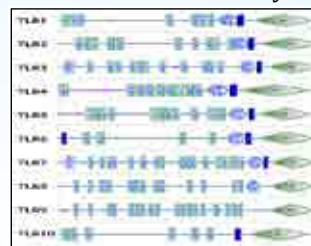
Recombinant yeast clones showing the cellulolytic activity

Toll-like receptors in farm animals - Evolutionary lineages and application in disease resistance

- ❖ Sequenced all 10 TLR genes of goats, buffalo, Yak and Mithun and modelled the TLR with their ligands that revealed differences in their ligand binding affinities. Innate disease resistance of Toda buffaloes related to higher levels of TLR mRNA expression.
- ❖ Novel SNPs identified in promoter region of Tumour necrosis factor alpha gene in Toda buffaloes. Novel SNPs identified in goat TNF alpha promoter related to blue tongue resistance (as compared to sheep).

Applied bioinformatics knowledge on modelling TLR of farm animals and analysis of transcriptome of virus-infected cells.

- ❖ Pioneered work on TLRs leading to a cascading effect on similar work on other species like chickens, ducks etc. Created a platform for the study on 'Virogenomics' – the science that has the potential to lead to anti-viral drug discoveries. Disease resistance of the Indian breeds of buffaloes and goats characterized and confirmed. The project has generated wealth of genome sequence data and 20 research publications thereby enabled us to be identified as a research group in the field of innate immunity.



Diagrammatic representation of the domains of the Goat TLR 1-10



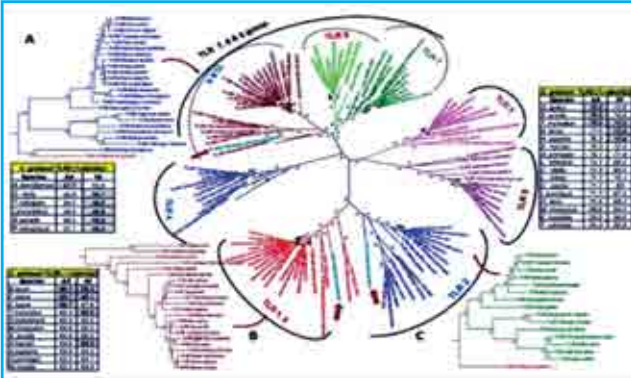
Identification of a novel SNP in the TNF alpha promoter of Toda as compared to Murrah

Toll like receptors in phylogenetically divergent fish species - their contribution in modulating the innate immunity

- ❖ Pioneered work on TLRs in sharks leading to a generation of information useful for evolutionary lineage studies in other species. Applied bioinformatics knowledge on modelling TLR of sharks and analysis of transcriptome of spleen and kidney. Generated the transcriptome from the spleen and kidney tissues (a total of 1,606,172 transcripts) of the shark, *Chiloscyllium griseum* using the Illumina HiSeq2000 platform.
- ❖ The TLR types- TLR2, TLR3, TLR6 and TLR9. The presence of the other known intra-cytoplasmic PRRs (such as NOD-1, NOD-2, NALP3, NALP-5, RIG-I and MDA5) has been confirmed and reported for the first time. The dsRNA sensing TLR3, its localization, modeling and docking to Poly I:C has been performed to confirm the recognition of Poly I:C by shark TLR. *Phylogenetic* relationship of the toll like receptor type transcripts of *Chiloscyllium griseum* identified from the transcriptome data. The sequences of the TLR



types TLR2 (1410 nt), TLR6 (2436 nt) and TLR9 (1431 nt) of *C. griseum* was aligned with the other sequences from GenBank. Note: The grouping of the TLR2 and TLR6 of *C. griseum* with the bacterial PAMP recognizing TLR group (namely the TLR1, 2, 4, 5 & 6) while the TLR9 groups itself with the TLR7, 8 & 9 family;-



Schematic diagram of the domain organization of the *Chiloscylidium griseum* TLR type transcripts - TLR9, TLR2 and TLR6 predicted using the SMART software

Development of User-Friendly, Discriminatory Diagnostics and New Generation Vaccines for Classical swine Fever

- ◆ Establishment of a Regional CSF Referral Laboratory in southern States of India. CSFV E2 specific monoclonal antibodies developed, characterized and utilized in lateral flow strip test for rapid antigen detection. CSFV E2 gene cloned into pTriEx 1.1 Neo vector, transfected into baculovirus vector and the protein expression was confirmed by indirect FAT.
- ◆ Developed cell culture adapted candidate vaccine strain from characterized CSFV field isolates. Development of cell culture adapted vaccine for classical swine fever. Field based diagnostic test viz., rapid lateral flow strip test for detection of classical swine fever antigen has been developed. Genotypic analysis revealed the circulation of 1.1, 2.1 and 2.2 genotypes.



Lateral flow strip test for Classical swine fever virus antigen detection from TCF 1-6 positive TCF 7 - Negative TCF

Regulation of follicular dynamics in crossbred cows for augmenting fertility and superstimulation

- ◆ Crossbred cows exhibit two- and three- follicular waves predominantly during the oestrous cycle. Seasonal influence on follicular developmental pattern was recorded. Angiogenic properties of the follicle seems to have influence on ovulatory status. Technique of 'Follicular wave synchronization' was developed and can be successfully employed in enhancement of fertility and superovulatory status. Complete ultrasonographic characterization of follicular and luteal development was documented and reported for the first time in Indian crossbred cattle. Complete angiogenic characterization of follicular and luteal development was documented and reported for the first time in crossbred cattle.

Unit I - Molecular Diagnostics

- ◆ Four samples collected from cattle and black bug for tuberculosis screening by PCR showed one black bug as positive. Three faecal samples received for paratuberculosis screening by PCR showed positivity in all the three samples. Urine (22 numbers) and blood (32 numbers) samples received for dark field analysis of leptospirosis showed 6 samples positive in dogs and 2 in horses.

Unit II - Genomics and Stem Cells

- ◆ Chicken Platelet Rich Plasma were used as culture supplements for derivation of bone marrow and liver progenitor cell cultures and the results showed no significant difference ($p < 0.5$) when compared to fetal bovine serum supplementation.

Unit III - Cell Culture and Hybridoma

- ◆ Prevalence of feline parvovirus in cats was confirmed by PCR and sequencing. New pathogenic fowl adenovirus serotype 2 in vaccinated flock was identified by PCR - RFLP and sequencing. Pathogenic fowl adenovirus 2 was passaged 15 times in QT 35 cell line. Prevalence of feline peritonitis virus was identified by RT-PCR using M gene specific primers and the expected amplicon of 295bp was observed.

Unit IV - Immunotechnology

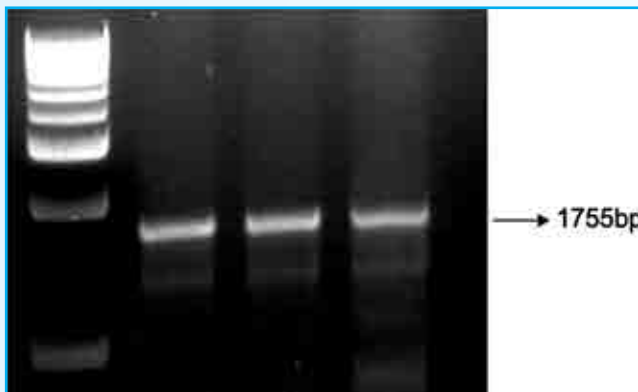
- ◆ One hundred and seventeen samples were analyzed by flow cytometry for screening apoptosis induced by Newcastle disease virus in cancer cells, apoptosis induced by chikunugunya virus in BHK21 cells etc. and offered flow cytometer facility to research students of other institutes on payment basis. Two samples received from the MVC hospital



was screened for Canine distemper viral genome by RT-PCR and both were found positive by RT-PCR

Unit V - Centralized Embryo Biotechnology

- ◆ Sheep (n=300) and Goat IVF embryos (n=100) were produced using different culture media and the presence of imprinting genes viz., H19, IGF and IGFR were identified by PCR. Donor (n=2) and recipient animals (n=4) were selected and synchronized using CIDR for embryo transfer work in cow. 8 embryos were collected from two Donor animals and good quality embryos were transferred with in vitro parthenogenetic embryos to recipients (n=4). One recipient is pregnant (45 days) and confirmed by ultrasound.
- ◆ Different activation treatments (Ionomycin, Ethanol and 6-DMAP) were used for ICSI embryo production. Ionomycin + 6 DMP combination gave better results.



Oncolytic Properties of Newcastle Disease Virus and its Recombinant Hemagglutinin - Neuraminidase protein

- * Three cancer cell lines, MCF-7 (Human mammary adenocarcinoma), HeLa (Human cervical carcinoma) and A72 (Canine carcinoma) were used to study the oncolytic properties of the Indian isolates, velogenic NDV 2K17, mesogenic NDV 2K36 and 2K3. Three NDV isolates, 2K17 (velogenic), 2K36 and 2K3 (mesogenic) were shown to exhibit their oncolytic properties in cancer cell lines

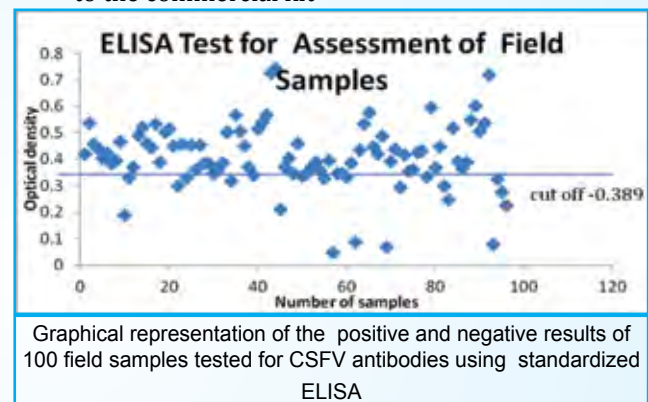
Preparation, characterization and in vitro transfection analysis of Chitosan-based nanoparticles

Chitosan nanoparticles were developed to be used as vehicle to transfect the plasmid DNA pEGFP-C1 expressing green fluorescence in the host cells. The

cytotoxic properties of chitosan nanoparticles were determined using MTT assay and around 75 μ g of chitosan nanoparticles was found to be the optimal amount which did not induce cell death and enhanced the cell proliferation. Hence chitosan nanoparticles at optimal concentration can be used as an efficient gene delivering vehicles in many host systems.

Development and evaluation of indirect ELISA for assessing classical swine fever virus antibodies in pigs

- * CSFV E2 gene (1171 bp) was cloned into pTriEx 1.1 neo vector and was expressed in prokaryotic cells - BL21 (DE3) cells. Using the recombinant CSFV E2 protein, an indirect ELISA was optimized with a coating antigen concentration of 700 ng per well. Plate ELISA was optimized and compared with commercial kit and could be used as an alternative to the commercial kit



Animal Health

Transcription Pattern of Sirtuin 1 Gene In Vanadium Complex Treated Diabetic Rats

The study was carried out to find the transcription pattern of sirtuin-1 gene and explore the anti-diabetic effects of nano vanadium pentoxide on streptozotocin induced diabetic rats. The parameters studied were blood glucose, total protein, lipid profile, urea, creatinine, calcium, phosphorus, ALT, AST levels in serum and body weight.

Nano vanadium pentoxide treatment did not show any toxic effects in normal control rats. It was observed that the nano vanadium pentoxide significantly decreased the serum glucose levels in diabetic rats by mimicking the action of insulin. Nano vanadium pentoxide improved lipid metabolism by significantly reducing the serum triacylglycerol and total cholesterol levels. Significant reduction in ALT, AST, urea and creatinine levels have revealed that vanadium is non-toxic and has protective effect on liver.



Oral administration of nano vanadium efficiently reduced the glucose level, enhanced the lipid and protein metabolism than that of ordinary vanadium due to efficient uptake of nanoparticles via gastrointestinal tract and higher reactivity and biological activity of nanoparticles due to its large surface area to mass ratio. Hence, sirtuin-1 upregulated in the nano vanadium complex treated diabetic rats when compared to control and diabetic rats.

Evaluation of the Efficacy of Insulin loaded Nanoparticles in experimentally induced Diabetic Rats

- ➔ The study was carried out to evaluate the antidiabetic potential of insulin delivery using PLGA nanocopolymer through oral route on streptozotocin induced diabetic rats. The parameters studied were serum glucose, serum insulin, lipid profile, total protein, urea, creatinine, ALT, AST levels, calcium, phosphorus, sodium and potassium, liver glycogen, tissue lipid peroxidation, enzymatic and non enzymatic antioxidant levels. Both the polymers significantly decreased serum triacylglycerol, total cholesterol, urea and creatinine at sixth hour. At twelfth hour the altered serum biochemical parameters returned to the level which was seen in diabetic rats.
- ➔ The study showed that PLGA nanopolymer tagged insulin couldn't normalize the activities of superoxide dismutase, glutathione peroxidase, catalase and also the levels of reduced glutathione and lipid peroxidation. Histopathological studies revealed that PLGA nanopolymer tagged insulin could not restore the damages caused by streptozotocin in liver, kidney and pancreatic tissues. PLGA nanopolymer tagged insulin reduced the glucose level significantly. Among the two polymers used viz. 70:30 and 60:40 the polymer prepared in the ratio of 60:40 exhibited better glycemic control than the polymer with the ratio of 70:30.

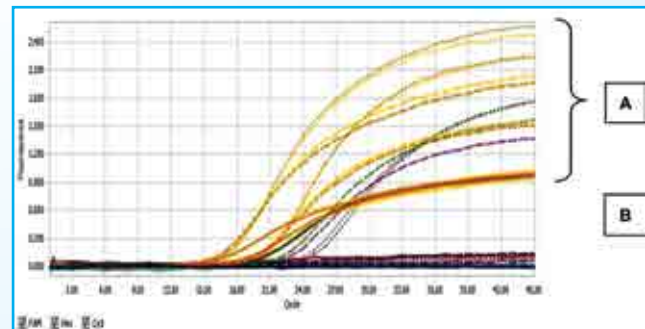
Effect of Vanadium Pentoxide and Nanovanadium Pentoxide in Experimentally induced Diabetic Rats

The study was carried out to explore the anti-diabetic effects of vanadium pentoxide and nano vanadium pentoxide on streptozotocin induced diabetic rats. The parameters studied were blood glucose, total protein, lipid profile, urea, creatinine, calcium, phosphorus, ALT and AST levels in serum. Body weight, liver glycogen, tissue lipid peroxidation, enzymatic and non-enzymatic antioxidant levels. Vanadium pentoxide and nano vanadium pentoxide treatment did

not show any toxic effects in normal control rats. Oral administration of nano vanadium efficiently reduced the glucose level, enhanced the lipid and protein metabolism and also exhibited better antioxidant activity than that of ordinary vanadium due to efficient uptake of nanoparticles via gastrointestinal tract and higher reactivity and biological activity of nanoparticles due to its large surface area to mass ratio.

Establishment of Centre for poultry products certification for freedom from microbes for export

Standard operating protocol (SOP) for simultaneous detection of *M. gallisepticum* and *M. synoviae* in poultry samples using multiplex real time PCR was developed. Protocol for isolation and identification of Newcastle disease virus from poultry samples were standardized. Real time PCR assays for detection of NDV were developed. The SOP developed for Salmonella has rendered the utility of multiplex qPCR assay for rapid and semi-automated detection and quantification of salmonella serovars over a wider detection range in a single microtube. The real time PCR assays for NDV could rapidly detect and differentiate the NDV pathotypes. Infrastructure necessary for starting a Centre for certifying poultry products free from microbes was established. A system for certifying animal products free from microbes – particularly Salmonella, Mycoplasma, Newcastle disease and SOPs were developed.



Results of absolute quantification of multiplex real time PCR carried out using template DNA isolated from *Salmonella* spp., suspected poultry samples

Humoral and Cell Mediated Immune Response to Infectious Bursal Disease Virus Vaccinated Chicken

- ❖ The study was carried out to assess the humoral and cell-mediated immune response to Infectious Bursal Disease Virus (IBDV) vaccinated chicken. Two experimental live vaccines (intermediate and intermediate plus strain) and two commercial vaccines (live and inactivated) were used. Both the live vaccines strains were found to be protective and intermediate plus strain vaccine showed



higher antibody titre in QAGID and ELISA both in experimental and field trials. Commercially available vaccines that were tested showed prolonged immune response in both live and inactivated vaccinated chickens under field conditions.

Recovery of Newcastle Disease Virus (NDV-D58 strain) from cDNA

- ❖ The focus of the present study is to develop a plasmid vector backbone to clone the cDNA of the whole genome of NDV D58 strain and to develop a system based on reverse genetics to recover recombinant NDV D58 strain. NDV (D58) strain was rescued from cloned cDNA using T7 RNA polymerase system and helper RNP plasmids in a cell line that constitutively expresses T7 RNA polymerase. The helper plasmids were prepared by individually cloning NP, P and L gene ORFs into pCIneo mammalian expression vector. Transfection experiments were carried out using the helper plasmids and the pNDVD58fl in a serum free medium into the T7 RNA polymerase expressing BSRT7/5 cell line. Temporal samples from the transfected cell culture supernatant were collected every 24 hours post-transfection and the presence of rescued virus was confirmed using M-gene based qRT-PCR and conventional PCR and HA activity. The vector backbone containing full genome of NDV developed using reverse genetics, could be later used either for development of a DIVA vaccine or to study the molecular pathogenesis of NDV through development of chimeric viruses by swapping genes between NDV strains.

Chicken infectious anaemia :Molecular diagnosis and serosurveillance

- ❖ Forty CIAV suspected tissue samples such as liver, spleen, thymus and bone marrow were collected from 10 layer farms in and around Namakkal. The field isolates CIAV I and CIAV 2 showed 98.9 and 90.6 % similarity respectively with INDAP07 isolate from South India.

Molecular characterization of oncogenic genes, pathotyping and protectotyping of Marek's disease virus

- ❖ Pathotyping and protectotyping trials designated the isolate Ind/TN/12/03 as very virulent MDV and isolates Ind/TN/11/01, Ind /KA/12/02 as virulent MDV. The monovalent and bivalent vaccines available in India are not able to protect completely against the very virulent strain circulating among vaccinated flocks.

Isolation, Identification and molecular characterization of infectious laryngotracheitis virus in chicken

- ❖ The prevalence of ILT in layers in Namakkal region was observed in the age group of 7 to 42 weeks with maximum incidence in the age group of 10 to 20 weeks (40.47%) followed by 20 to 30 weeks (26.19 %). The maximum mortality was observed in 10 to 20 weeks age group (41%) followed by 20 to 30 weeks (35 %). The average mortality per cent recorded in layer was 28.60. Molecular identification of ICP4 gene and Tk gene of the field isolates of ILTV was done and amplicons of 635 bp and 649 bp obtained confirmed the prevalence of ILT. Homology analysis of twenty field isolates of ILTV characterized for ICP4 gene showed that the nucleotide sequences of the 20 isolates and vaccine strain was 99.2 – 100.0 per cent and the divergence was in the range between 0.2 to 0.6.
- ❖ Homology analysis of twenty field isolates of ILTV characterized for Tk gene submitted to NCBI and blasted in comparison with the Brazilian strains showed that the homology of the nucleotide sequences within the 20 isolates and vaccine strain was in the range between 96.5 – 100.0 per cent and the divergence was in the between 0.1 to 1.4. For identification of ILTV from field outbreaks, AGPT was a simpler and cheaper method and Dot ELISA as a pen side diagnostic test for early detection of field isolates of ILTV.

Molecular characterization and analysis of capsid protein (VP2) gene of Canine Parvovirus (CPV)

- ❖ Haemagglutination test showed eight positive samples out of ten samples (80%) whereas PCR amplification with specific primers showed the presence of CPV in all the ten samples (100%). The findings suggest that the PCR diagnosis method using specific primers was more sensitive than HA test.

Remote Integrated Systems for Controlling Nematodes using Emerging Technology for Both Resource-Poor and Commercial Farmers (RISC-NET)

- ❖ Status of anthelmintic resistance to Benzimidazoles, Levamisole and Ivermectin in 177 farms (120 sheep farms and 57 goat farms) of four agro-climatic zones of Tamil Nadu (Cauvery delta, High altitude, High rainfall and Southern Districts) were assessed from March 2011 to October 2012. Mapping of anthelmintic resistance status was carried out. Evaluation of FAMACHA© chart to detect haemonchosis based on anaemia status was carried out in two state farms and two University



farms in Tamil Nadu and A field demonstration was given to field veterinarians by the collaborators from Moredun Research Institute and University of Pretoria on the usage of this chart. A similar chart for use in indigenous sheep was developed. Con-A purified native antigens from *Mecistocirrus digitatus* worms were tested in buffalo calves against *M. digitatus*. Anemia detection chart was developed for local sheep breeds.

- ❖ Con A purified antigen from *M. digitatus* was found to be potential vaccine candidate. Anthelmintic Resistance status revealed the presence of 100% resistance to Albendazole and Levamisole in Cauvery delta and southern districts zones. 100 µg of Con-A purified native antigens from *Mecistocirrus digitatus* reduced 62% faecal egg count with significant level of IgG response on homologous challenged with 20000 L3. Twelve pamphlets (six in Tamil and six in English) on deworming, anthelmintic resistance and usage of FAMACHA chart and a text book entitled “Endoparasitic diseases of sheep and goats” was distributed to veterinarians and farmers.

Anticoccidial Vaccine Development: The Importance of Genetic Diversity and Delivery Strategy

- ❖ Incidence of *Eimeria* species was studied in Southern India including Commercial Broiler, Commercial Broiler breeder, Commercial Layer, Colour Broiler and Backyard poultry systems of managements. Highest incidence of *E. tenella* (57.594%) was observed in the samples tested followed by *E. mitis* (25.346%), *E. acervulina* (19.499%), *E. necatrix* (8.33%), *E. maxima* (8.11%) and *E. brunetti* (0.33%) in Southern India. National Coccidia alert network was updated with the information for the farmers and for the farm managers.

Semiochemical sustained release device for the control of dog tick, *Rhipicephalus sanguineus*

- ❖ Sustained release of assembly pheromone was attempted by incorporating them into microparticles for the control of three-host dog tick, *Rhipicephalus sanguineus*. Calcium alginate, chitosan and polycaprolactone (PCL) were utilized for encapsulation of assembly pheromone and deltamethrin was used in conjunction with the assembly pheromone to kill the lured ticks. Two combinations of assembly pheromone, with and without hematin were utilized as a lure for the different unfed life stages of *R. sanguineus* ticks. Maximum mortality following rapid attraction was evident with the porous calcium alginate beads

without hematin wherein all three stages showed 100 per cent mortality 24 hours post-exposure. The sustained release device containing porous calcium alginate test beads attracted and killed all environmental stages of ticks in the field trial. Calcium alginate beads with assembly pheromone and deltamethrin found to attract all three stages of dog tick and showed 100 per cent mortality 24 hours post-exposure.



Characterization of excretory/secretory antigens of various species of ovine amphistomes

- ❖ Excretory / Secretory (E/S) antigen from *Cotylophoron cotylophorum* and *Gastrothylax crumenifer* were purified using DEAE-Sephadex A-25 anion exchange chromatography. The purified E/S antigens of *C. cotylophorum* revealed 6 polypeptide bands ranging from 10 to 30 kDa whereas *G. crumenifer* revealed faint hazy bands between 50 to 100 kDa. Immunodominant and cross reactive protein bands were identified in the E/S antigens and somatic antigens of *C. cotylophorum* and *G. crumenifer*.

Designing an eco-friendly cattle tick control device

Sustained release porous calcium alginate micro particles were prepared incorporating attractant sex pheromone (ASP) and tulsi oil. In the petridish bioassay with the pheromone control beads, the per cent attraction was recorded to be 64 and 100 for the larvae and males respectively, 24 hours post-exposure. When exposed to the test beads with tulsi oil and ASP, the per cent mortality in larvae was 1, 5.5, 8.5, 71.5 and 100 in 30 minutes, 1 hour, 2 hours, 24 and 48 hours post-exposure respectively, while with tulsi oil control the per cent mortality was 0.5, 3.5, 5, 30 and 80 during the same time frame. Sustained release porous calcium alginate micro particles with attractant sex pheromone (ASP) and tulsi oil found to have highly effective in the environmental control of *R. microplus* ticks.



Detection of acaricide resistance in *Rhipicephalus sanguineus*

- ❖ Pyrethroid resistance of *Rhipicephalus sanguineus* ticks were studied in Chennai by performing Adult immersion test and Larval Packet Test. PCR was performed on tick larvae and adults ticks using allele-specific primers to amplify mutated genotypes carboxyl esterase gene and sodium channel gene. The work confirmed the resistance was identified in carboxyl esterase gene and domain I I, S4-5 linker region of sodium channel gene shows no mutation.

Evaluation of plant essential oils for control of house flies

- ❖ The efficacy of plant essential oils was evaluated against house flies in the laboratory and under field condition. Essential oils from the fresh leaves and powders of eucalyptus, mint, lemon grass and peels of orange were analyzed and identified. Efficacy of essential oils against larvae and pupae of house flies was evaluated at different concentrations viz., 50, 10, 150 and 200 μ l by in vitro methods. LD50 values of mixed oil, mint, lemon grass, orange and eucalyptus against larvae were 5.89, 29.58, 33.28, 37.42 and 48.2 μ l and pupae were 21.20, 18.26, 48.27, 17.80 and 15.69 μ l, respectively.

Experimental studies on ochratoxin (OA)-infectious bronchitis virus (IBV) interaction in broiler chicken

- ❖ In OA-IBV interaction trial, the birds challenged with 10⁶ EID₅₀ IBV on 28th day showed loss of appetite and dullness. On 4 days post challenge (DPC), pathological changes were observed in the trachea and lung and mean score of histopathological changes was higher in the IBV challenged group. On 21 DPC, pathological changes were observed in the trachea and lung. Inoculation of IBV in 9-11 day old embryonated eggs resulted in curling and dwarfing of embryos with histopathological changes. 100 ppb of OA toxin affected health, lipid peroxidation, antioxidant and immune status of the birds. OA feeding significantly decreased the cell mediated immunity and humoral immunity to IBV challenge. However, the vaccine titres were not significantly affected in OA toxicity and confirmed the IBV infection by virus isolation.

Antihyperglycaemic and Related Effects of Leaf Extract of *Andrographis paniculata* In experimentally Induced Diabetic Rats

- ❖ Diabetes was induced by single intraperitoneal injection of alloxan monohydrate at the dose rate of 150 mg/kg BW. Diabetes was confirmed after

72 hours of alloxan injection by estimating blood glucose level and those rats showing more than 250 mg/dL were considered as diabetic. The study showed that the leaf extract of AP could not improve serum insulin levels over a period of 28 days. Since, the changes were not reversed in the treatment groups, the extract was believed to have regulated the glucose level by an extra pancreatic mechanism. As it could effectively reduce the glucose levels, AP could be considered as an alternative therapeutic agent in the antidiabetic therapeutic regimen.

Exploration of anti-inflammatory potential of emu oil formulation and glycyrrhizic acid in acetic acid induced inflammatory bowel disease in rats

- ❖ The period of experimentation was ten days. The rats in each group were pretreated orally for three days with the respective drugs such as emu oil, emu oil formulation, glycyrrhizic acid and combination of emu oil and glycyrrhizic acid. On day 4, 5% acetic acid was intra rectally administered to the rats. The oral treatment with the drugs was continued till day 10. Rats were periodically sacrificed on days 6, 8 and 10. The effects of study drugs were compared with the standard drug sulfasalazine. All the study drugs were able to show potent anti-inflammatory effects by reducing the macroscopic scores, microscopic scores and colon weight to length ratio, by reducing the oxidant parameters and improving the levels of anti-oxidants, colonic alkaline phosphatase and nitrite and nitrate and restored the parameters to that of the untreated control. All the treatment drugs were able to downregulate the expression of TNF- α while combination of emu oil and glycyrrhizic acid and emu oil formulation caused significant upregulation of anti-inflammatory gene PPAR γ . Combination of emu oil and glycyrrhizic acid formulation were found to exhibit better anti-inflammatory potential than emu oil as such. Thus, it is obvious that combination of emu oil with glycyrrhizic acid and the modified formulation of emu oil would be potential candidates such as alternative drugs for IBD.

Evaluation of anti-arthritic effect of *Holoptelea integrifolia* in experimentally induced arthritic model in rats

- ❖ The present study was taken up to explore the anti arthritic effect of aqueous and ethnolic extracts of *Holoptelea integrifolia* at different doses (200mg/kg and 400mg/kg) in adjuvant induced arthritic model in rats. Diclofenac produced significant



reduction in paw swelling, where as the extracts of *Holoptelea integrifolia* significantly reduced paw swelling compared to the arthritic control. Markers of liver damage were elevated in the arthritic group where as treatment with *Holoptelea integrifolia* has significantly altered the variables towards normal. In the present study both the extracts of *Holoptelea integrifolia* were able to reverse the damage caused by arthritis and improved the condition towards normalcy that was evident from the alteration of parameters compared to untreated arthritic group. The results indicate that ethanolic extract at the dose of 400mg/kg was better than aqueous extract of *Holoptelea integrifolia* in controlling arthritis.

Comparative and combined fly control effect of neem products with cyromazine in poultry

- ❖ Pupicidal activity was observed on 5th day by in vitro method after spraying neem oil for 3 days. Dietary inclusion of neem products (500g and 1kg) and cyromazine (1%) had no significant effect on production parameters in layers. Larvicidal activity was recorded on 14th day by dietary inclusion of neem whereas on 28th day by only spraying. Reduction in fly density was observed from 42nd day in all treatment groups. Dietary inclusion of neem seed and neem oil spray in litter material showed good fly control effect without affecting production parameters. The efficacy of neem product was comparable to cyromazine and was economical.

Zoonotic tuberculosis - evaluating the status and potential hazards

- ❖ Multiplex PCR was standardized to differentiate among members of *Mycobacterium tuberculosis* complex for zoonotic tuberculosis from different samples. Results showed Gross TB lesions in bovines-15.9% in abattoir survey and M tuberculosis isolates in bovines. Spoligotyping-MTBC isolates identified one lineage (orphan) not matching *Mycobacterium tuberculosis* human isolate.

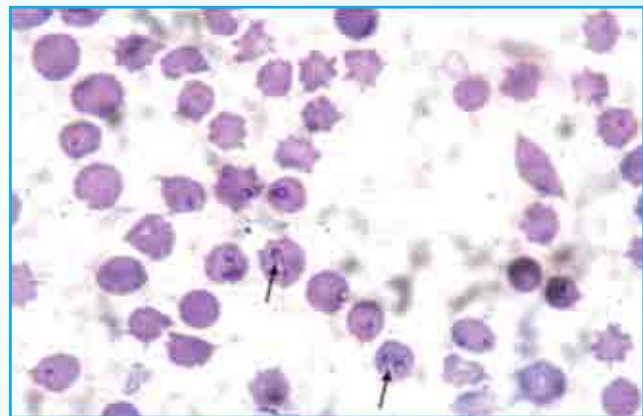
Studies on rabies diagnosis, prevalence and factors affecting immune response to vaccination

- ❖ This study concentrated on the factors affecting immune response to rabies vaccination in dogs, prevalence and determinants of dog rabies in Chennai and to evaluate the suitability of nuchal skin biopsy as an alternate sample for rabies diagnosis. The study ruled out the factors those favours maintenance of protective antibody levels in the canine population. The factors are regular

vaccination, companionship and age of the animal. The study emphasise the education of the public on the vaccination program of dogs against rabies. The study found that DRIT (modified) can be used as an effective ante-mortem test for dogs suspected with rabies. Utility of nuchal skin as an alternative sample for rabies diagnosis especially in cases where the brain is not fit for diagnosis.

Monitoring the carrier status of theileriosis in cattle

- ❖ Over all prevalence of subclinical theileriosis as tested by PCR in cattle was 14.10 per cent and recorded as high (16.41%) in cows and low in buffaloes (0%). Breed wise prevalence of subclinical theileriosis was high in Jersey cross breed followed by HF cross breed and high in non pregnant cattle. High prevalence of subclinical theileriosis was recorded in the age group of 5 to 7 years. Field isolates of *Theileria annulata* obtained in this study were found to have 98 per cent homology with the reference strain EF618726.1 based on sequence analysis of PCR products.



Theileria annulata - piroplasms in blood smear

Study on fecal cortisol and health status in captive felids

- ❖ Ectoparasites and endoparasites in fecal samples of all felids (Lion, Tiger, White tiger, Leopards, Leopard cat and Jungle cat), fecal cortisol level in fecal samples of large felids (Lion, Tiger and Leopard) and clinical conditions encountered in captive felids at Arignar Anna Zoological Park, Vandalur were studied. Among the felids, *Rhipicephalus sanguineus* was the tick species encountered in lions of the Rescue centre of the Arignar Anna Zoological Park, Vandalur. Evidences of internal helminthic fauna like *Toxocara* sp. *Paragonimus* sp. and *Strongyles* were brought to limelight in addition to the mixed parasitic infections in captive felids. Out of 58 fecal samples tested during summer



from Arignar Anna Zoological Park, Vandalur, 56 (96.55%) revealed overall endoparasitic prevalence and in case of winter season, out of 60 fecal samples, 56 (93.33%) revealed evidences of internal parasites. Assessment of fecal cortisol level was carried out in larger felids like lion, tigers and leopards. There were season-wise significant variations ($P < 0.01$) among larger felids (lion, tigers including white tigers and leopards), except the case with leopards, in which the variations of mean fecal cortisol level between summer season and winter season were not significant. *Toxocara* sp. *Paragonimus* sp. and *Strongyles* in captive felids of Arignar Anna Zoological Park were brought to limelight.

Health assessment in captive pythons

- Endoparasitic fauna like *Ophidascaris* sp., *Kalicephalus* sp., *Strongyloides* sp., *Capillaria* sp., oocysts of *Eimeria* and mixed infections of these were present in the fecal samples of fifty five pythons and *Ophidascaris* sp. was the predominant endoparasite in 46% of the samples followed by encountering of *Capillaria* sp. (11%), *Kalicephalus* sp. (8%), *Strongyloides* sp. (8%) and mixed infections including all these in addition to oocysts of *Eimeria* in 27% of the samples. Ixodid ticks-*Amblyomma* (*Aponomma*) *gervaisi* and *Rhipicephalus* (*Boophilus*) sp. were the ectoparasites affecting the pythons.
- The neem leaf extracts used in this research was found to have good efficacy against internal parasites, as the case with ivermectin. PCR was used in fifty five fecal samples of pythons with concerned primers and out of 49 positive fecal samples, Genus *Salmonella* (12.2%), *E.coli* (8.2%), Genus *Salmonella* with *Salmonella enteritidis* (8.2%), *E.coli* with Genus *Salmonella* (49%), *E.coli* with *S. enteritidis* (2%) and Genus *Salmonella* with *Salmonella enteritidis* and *E.coli* (20%) were detected. *Ophidascaris* sp., *Kalicephalus* sp., *Strongyloides* sp., *Capillaria* sp., oocysts of *Eimeria* and mixed infections of these were revealed in fecal samples of captive pythons. Similarly, Ixodid ticks-*Amblyomma* (*Aponomma*) *gervaisi* and *Rhipicephalus* (*Boophilus*) sp. were found to affect the pythons. Genus *Salmonella*, *Salmonella enteritidis* and *E.coli* were detected in the feces of captive pythons using PCR.

Development of vaccine for Goat pox disease

- Goat pox virus (West Bengal) isolate was passaged in vero cells upto 70th passages and

GPV (Thiruvapur) isolate upto 70th passage. They showed characteristic Cytopathic effects. Vaccine prepared with the isolate elicited good immune response in rabbits and in goats. The vaccine has been validated and will be available to the farmers to control goat pox disease

Assessment of Immune Response Against Newcastle Disease Oral Pellet vaccine in Desi chicken and Turkey

- In both turkey and desi chicken the antibody titre values in commercially vaccinated group were higher than oral pellet vaccine. Oral pellet vaccine was found to be easy for administration and protective.

Biotechnological Strategies for Productivity Enhancement of Emu (*Dromaius novaehollandiae*)

- Male emu birds were trained successfully for donating semen in an artificial cloaca. A reliable technique for handling female emu birds for artificial insemination was developed and standardized to get optimum fertility and hatchability. The sex of the emu birds could be accurately and correctly assessed by molecular methods developed in the scheme. Emu semen could be cryopreserved ideally using IMV poultry semen extender containing cryoprotectants DMSO at 9.0% level subjected to 30 minutes equilibration period and frozen by adopting slow freezing rate in straws as well as vials.



Female dummy for Semen collection in Emu

Influence of strain, age and system of management on the productive and reproductive performance of Guinea fowl

Two biological experiments were carried out to assess the influence of age, strain and system of management on the productive and reproductive



performance of Guinea fowl. Age exerted significant influence on all production and reproductive parameters irrespective of strain and system of management. The egg production in Guinea fowl was influenced by age wherein it attained three peaks of production in a gap of 20-24 weeks upto 95 weeks of age. The egg weight showed significant increasing trend following the egg production trend. Birds reared on cages had highly significant body weight upto market age. It can be concluded that White strain of Guinea fowl is the bird of choice for broiler Guinea fowl production and cage is the more preferred system to raise broiler birds. Pearl strain is the birds of choice for raising layer Guinea fowl production. Especially under cage system of management with numerical raise in egg number without much seasonal effect.

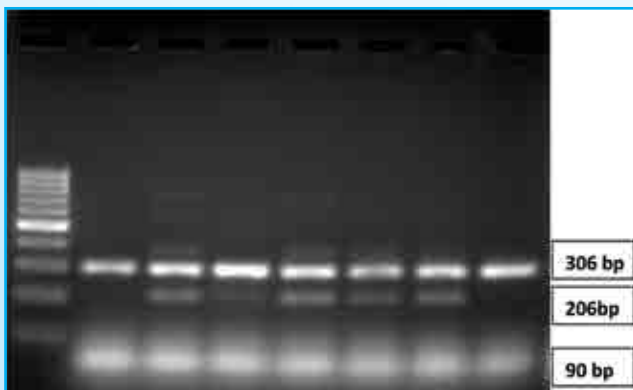


White Keets-Deep Litter

Pearl Keets - Cage

A study on the prevalence of *Mannheimia haemolytica* in cattle population in India

- Based on isolation and multiplex PCR results out of 707 samples tested 9.19% were found to be positive for *M. haemolytica*. The percent prevalence of *M. haemolytica* in different regions was 1.74% in central zone, 3.94% in west zone and 17.33% in south zone. The percent prevalence of *M. haemolytica* in white cattle and buffaloes was 9.59% and 8.40%. The percent prevalence



L1 – 100 bp marker ; L2 – Negative sample;

L3 – L7 – Positive samples; L8 – Negative control

for different age groups was 9.90%, 11.21% and 8.16% for upto 1 year, 1-6 years and above 6 years. The percent prevalence in male and female was 13.02% and 6.59% respectively.

Development of an inactivated swine fever virus (CSFV) vaccine

- An inactivated vaccine has been developed for classical swine fever virus. This vaccine is a cell culture based vaccine inactivated by BEI with montanide ISA 25 G as adjuvant. The vaccine was found to be protective upto a period for 12 months and withstood challenge with virulent CSFV.

Animal Production

Marker for draughtability in cattle

- In Bradykinin β 2-receptor gene, a total of 16 SNPs were found; of which SNP 42239G>A was associated with serum creatinine kinase in draught breeds such as Kangayam, Bargur and Hallikar cattle. Angiotensin I converting enzyme gene was found to influence the serum lactic acid level. The genotype GC could be preferred over GG and CC, as the muscle damage due to strenuous work in draught cattle was comparatively lower. The function of vascular endothelial growth factor-A gene is restoration of O₂ in the tissues, and hence found to associate with respiratory rate. The trinucleotide repeat (CAC) influences respiration, serum creatinine kinase and serum lactic acid levels. High heterozygosity at the locus suggests that this gene could be utilized as a potential marker for draughtability in cattle.

Polymorphism of growth and prolificacy genes in Vembur and Kilakarsal breeds of sheep

- Screening for genetic variations in part of Exons 2, 3, 4 and 5 and Introns 3, 4 and 3'UTR of GH gene with HaeIII –RFLP and MspI –RFLP revealed GH gene to be monomorphic in Vembur and Kilakarsal breeds. EcoP15I-RFLP of 365 bp fragment of GH gene revealed three genotypes (AA, AB and BB) in Vembur sheep due to a T>C transition in 3'UTR of GH gene. Absence of FecB mutation in both Vembur and Kilakarsal breeds of sheep.

Toll-like receptor (TLR) gene polymorphism and its relationship with somatic cell count in cattle

- TLR2 gene was found to be highly polymorphic and twenty four mutations were identified of which 22 were SNPs (1 in exon 1 and 21 in exon 2); seven mutations were non-synonymous; there was a complete replacement of "T" (*Bos taurus*) by



C in crossbred cows at SNP position 11538. Seven novel SNPs were found in TLR2 gene and they are: 199C>T, 10092C>T, 10587T>A, 10935C>A, 11214C>A, 11720C>T and 11838C>T. TLR4 gene revealed 11 SNPs; one SNP at position 9787 resulted in non-synonymous mutation; amino acid threonine in *Bos taurus* at position 674 was replaced by isoleucine. Amino acids glutamic acid, glycine, isoleucine, histidine, arginine, threonine and histidine in *Bos taurus* at positions 63, 68, 211, 327, 337, 605 and 665 bp were replaced by asparagine, serine, valine, glutamic acid, lysine, methionine and glutamine in *Bos indicus*. SNP 10095G>T of TLR2 gene influenced SCS significantly; GG and GT genotypes had lower SCS implicating better mastitis resistance.

Genetic evaluation of growth performance of farmbred Nilagiri and Sandyno sheep

- ❖ The genetic parameters obtained for the different growth efficiency traits indicate Kleiber ratio and absolute growth rate as better criteria than relative growth rate for selection. The effective population size in both the populations (Nilagiri and Sandyno) was above critical levels. Inbreeding was found to have depressive effect on growth traits. In Nilagiri population, the variability in six month weight is less, while nine month body weight was the trait with high heritability and better expected responses in later traits. Since nine month body weight is available late, possibility of multistage selection with nine month body weight as one of the criterion could be explored. The moderate estimates of heritability for most of the growth traits and positive genetic trends indicate scope for further improvement in these traits. High genetic correlations between bodyweight traits provided scope for indirect selection.

Improvement of feed resources and nutrient utilization in raising animal production

- ★ Ball mill was used for production of nano form of dicalcium phosphate with particle size and zeta potential of 46.60 nm, -26 mV and copper sulphate with 44.87nm, -20.5mV respectively. Yield for dicalcium phosphate and copper sulphate respectively was 25g/hour and 100g/hour. Cytotoxicity assay of the nano form of dicalcium phosphate and copper sulphate in African monkey kidney cells (Vero cell line) revealed that up to 10 percent did not cause any cell inhibition and was considered safe at this level. In spite of reduced intake of calcium, phosphorus and copper nano form of minerals did not have a negative impact on

body weight, hen day egg production, egg mass, and egg shell quality. The 50% nano form of dicalcium phosphate and 25% nano form copper sulphate supplemented group of birds had significantly lowest ($p < 0.05$) feed intake, which reflected in improved feed efficiency. Significant difference ($p < 0.05$) in egg weight and specific gravity was altered due to nano minerals. Reduction in nano form of calcium, phosphorus and copper intake had no adverse effect on egg shell quality.

- ★ A Validation study on growing Sandyno lambs supplemented with TANUVAS SMART (Type III) mineral mixture Vs nano form of dicalcium phosphate at 50% and nano form of copper sulphate at 25% incorporated TANUVAS SMART (Type III) mineral mixture confirmed the earlier finding by exhibiting no significant variations between treatments in growth rate, feed conversion ratio, tibial retention of calcium and phosphorus, liver retention of copper, serum calcium, phosphorus, copper, ceruloplasmin concentration, superoxide dismutase activity, slaughter characteristics, wool yield and quality. The 50% nano form of dicalcium phosphate and 25% nano form copper sulphate supplemented group of birds had significantly lowest ($p < 0.05$) feed intake, which reflected in improved feed efficiency. There was no significant variations between nano form of dicalcium phosphate at 50% and nano form of copper sulphate at 25% and coarse form minerals in growth rate, feed conversion ratio, tibial retention of calcium and phosphorus etc., in Sandyno lambs.

The effect of TANUVAS GRAND supplement in augmenting milk production and preventing metabolic disorder in cattle and testing its efficacy through ODL based participatory research in Lifelong Learning for Farmers Programme

- ★ TANUVAS GRAND supplement was tested for its efficacy in 2297 cows and 44 buffaloes in Andanallur Block of Trichy District. 78.4 % animals responded to increase in milk yield ranging from 500 ml to 1500 ml with an average of 736 ml per cow per day leading to daily profit of ₹13.50/cow. Maximum response to increase in milk yield was observed in cereal based diet (43%). TANUVAS GRAND supplement increases the milk yield to the extent of 730 ml/day / cow through the improvement on the quality of microbial population for better degradability of feedstuff. TANUVAS GRAND supplement improved in the appetite of 936 animals and recovered 98 cows from acidosis due to unbalanced cereal feeding.



Developing feeding strategy to minimize methane emission from ruminants through plant metabolites

- ★ Plant metabolites like tannin at 3.39 % and saponin at 2.56 % from *Acacia nilotica* and malic acid at 0.42 % and fumaric acid at 0.23 % from *Medicago sativa* was able to reduced the methane emission (ml) per 100 mg of truly digested substrate by 18.62 % than control without affecting any deleterious effect on rumen fermentation characteristics. The cumulative effect of tannin and saponin in *Acacia nilotica* plant extract and malic acid and fumaric acid in *Medicago sativa* plant extract and their equivalent form with standard chemicals have significantly ($p < 0.01$) reduced the methane (ml) per 100 mg of truly digested substrate in 10 % more than selected level.



Estimation of methane emission in gas chromatography (GC)

In-vitro and in-vivo evaluation of Cibenza DP 100 (protease) preparation on the performance and carcass quality of broilers fed corn-soybean meal based diet in litter pens

- ★ Addition of Cibenza DP 100 at 0.05% was found to reduce the cost of feed of the pre starter, starter and finisher feeds by (2.98%). In addition, it provides an opportunity to reduce the levels of protein (lysine and methionine) in the ration and increase the returns by 11.69%. The beneficial effect of addition of protease in layer diet to reduce the level of protein in the ration has been documented.

Study of fenugreek extract as poultry feed supplement / ingredient

- ★ In broilers, fenugreek residue can be fed up to 2% without affecting productivity and yield of edible parts. The cost of feed / kg body weight gain was lower compare to control. In layer; fenugreek can be fed up to 2% without affecting production with better feed efficiency and egg qualities.

Efficacy of 'Sharkoferrol Vet' on the Performance of Broilers and Layers

- ★ Supplementation of Sharkoferrol vet for broilers, resulted in comparable production performance, whereas blood parameters viz Hb was better ($P > 0.05$), dressing percentage and abdominal fat were significantly higher. In layers, Sharkoferrol

vet supplementation resulted in comparable egg production and feed efficiency, whereas feed consumption was less ($P > 0.05$) by 2.76 g/bird/day, egg weight was significantly heavier in the early phase of production, decline in HI titre was significantly lower and blood Hb was lower.

Study on the efficacy of destrox to ameliorate feed toxins in broilers

- ★ Supplementation of Destrox @ 250g per ton of feed in broiler birds having beneficial effects such as feed intake, body weight, feed conversion ratio, nutrient digestibility and less feed cost and litter moisture. The addition of Destrox @ 250g per ton of feed to the aflatoxin based diets was effective in reducing the deleterious effects of aflatoxin and other toxins (endotoxin) produced by *Clostridium* spp. and *E.coli* in broilers.

Effect of graded levels of cabbage waste on the performance of broiler rabbits

- ★ Considering the growth performance and cost per kg live weight gain, cabbage waste can be fed up to 50 % for growers and the adult animals can be maintained on 100 per cent cabbage waste without affecting reproductive performance.

Effect of Q enzyme feeding on broiler performance

- ★ The first biological trial was conducted when the temperature humidity index (THI) was 24.46 to 30.20 C, the body weight gain, feed efficiency, production score and feed cost per live weight gain of birds fed CoQ10 at 20mg/kg in high energy (HE)/100 kcal more than the breeders specification was best. The beneficial effects the CoQ10 were diminished and the reverse effects were noticed when the supplementation of CoQ10 was 40mg/kg. Second biological trial was conducted when the THI was 24.46 to 33.05 C the body weight gain, feed efficiency, production score and feed cost per live weight gain of birds fed normal energy diet as per the breeders specifications was best. Increasing the energy levels in broiler diets decreased the production performance of birds in all three growth phases (pre starter, starter and finisher). Supplementation of 20mg/kg in HE improved performance over the unsupplemented HE fed birds. The decrease performance in HE fed is due to high THI resulted heat stress.

Supplementation of "Galactomannan depleted fenugreek residue" as feed additives for broiler breeder hens and commercial broilers

- ❖ The fenugreek seed and GDFR contained crude protein 26.65 and 33.79%; metabolisable energy



3125 and 3315 kcal/kg; lysine 1.13 and 1.27%; methionine 0.61 and 0.73% respectively. Based on the overall performance and cost effectiveness, supplementation of GDFR up to 2% level in broiler breeder and 0.2% level in broiler resulted in better performance and economical.

Open Nucleus Breeding System through multiple Ovulation and Embryo Transfer - Initiation of Embryo Transfer Programme at District Livestock Farm, Hosur

So far 56 cows have been flushed, out of which 263 embryos were transferred to the recipients and 52 cows delivered 28 male and 25 female calves



Materials Required for Embryo Flushing and Transfer

Abstract of the Embryos transferred in Farm and Field

	Farm	Field	Total
No. of cows flushed	6	50	56
No. of transferable embryos collected	30	241	271
Average No. of embryos/flushing	5	4.8	4.8
No. of embryos frozen	0	62	62
Fresh Embryos			
No. of embryos transferred	30	178	208
No. of recipients	27	175	202
No. of Pregnant cows	12	46	58
No. of cows delivered	9	38	47
Male (including twin calves)	6	19	25
Female	3	20	23
Frozen Embryos			
No. of embryos transferred	6	49	55
No. of recipients	6	49	55
No. of Pregnant cows	1	8	9
No. of cows delivered	1	4	5
Male	0	3	3
Female	1	1	2

Conception rate following oestrus induction with CIDR in buffaloes treated for retained fetal membranes

- A total of 32 buffaloes at 45-60 days post-partum period including 16 treated for retained fetal

membranes (RFM) and 16 normally calved (NC) were equally divided into four experimental groups (I,II,III & IV) each group comprised of 8 buffaloes. All experimental buffaloes at 60-75 days post-partum were inserted with Controlled Internal Drug Release (CIDR) Device intravaginally and left in situ for 9 days. All animals received an intra-muscular injection of 500 µg PGF2α at 24 hours prior to CIDR withdrawal. At 48 (first AI) and 72 hours (second AI) of CIDR removal. Pregnancy diagnosis was done by rectal examination at 60 days post-insemination. The percentage of ovulatory response assessed by ultrasonography following oestrus induction in NC and RFM affected buffaloes was 87.50, 75.00, 100.00 and 87.50 per cent in group I, II, III and IV. The overall conception rates obtained in NC and RFM affected buffaloes were 81.25 and 50.00 per cent. Oestrus induction with CIDR plus PGF2α with prior deworming and mineral mixture supplementation can be used in post-partum NC or RFM affected buffaloes to achieve maximum conception rate under field conditions.

Conception rate following ovsynch protocol in cows treated for retained fetal membranes

- Sixteen cows of 30 to 50 days post partum with the history of being treated for retained fetal membranes (RFM) and 16 cows with the history of normal calving (NC) were utilized into four groups, each consisting of eight animals. Group I-RFM affected, Group II-Normally calved (NC)cows received hormone injections as ovsynch protocol (GnRH+PGF-2α+GnRH) i.e., inj.2.5 ml containing 10 µg of buserlin acetate and inj. 2 ml of synthetic PGF-2α analogue containing 500 µg cloprostenol. Cows in the Group III RFM affected and Group IV which had normal calving served as untreated controls. Ovarian activity with oestrus response increased and the ovsynch protocol influenced and increased the conception rate of 75 .00 in group I with that of the 50.00 per cent in group III of the RFM affected cows. GnRH in combination of PGF2α as ovsynch protocol with the supplementation of minerals and stress free environment tends to improve the post-partum uterine and ovarian activity thereby increasing the conception rate which is the iconic deal in the dairy industry.

Role of oxidative stress on embryonic mortality in bovines

- A total number of 100 repeat breeder cows between second and fifth parity were selected and they were randomly and equally divided into



five groups as Group I, II, III, IV and V, each group consisted of 20 cows. Group I served as controls, Group II cows were treated for 3 weeks with intramuscular injection of Vitamin A, C and E at the dose rate of 800 IU/kg/week/animal, group III were treated with an intramuscular injection of flunixin meglumine at the dose rate of 1.1 mg/kg on day 12, 13, 14 and 15 post-insemination. Group IV Cows were treated with CIDR intravaginally for 9 days and AI was performed at induced oestrus following CIDR removal by the observation of oestrus signs. Cows in group V were administered with double injections of PGF₂α at 11 days apart at the dose rate of 25 mg/cow and all the cows were observed for signs of oestrus following second PGF₂α injection and AI was performed during induced oestrus. Out of 128 repeat breeding cows, 100 cows (78.13 per cent) were selected for the study based on the white side test and it indicated 21.87 per cent repeat breeding cows were affected with subclinical uterine infections. The mean serum glucose, total protein, albumin, globulin, total cholesterol and urea in repeat breeder cows. From day 0 to 60 in pregnant cows and day 0 to 20 in non pregnant repeat breeder cows, there was a gradual increase in serum Ca, P, Cu, Zn, Se, and vitamin A, C and E and oxidative biomarkers GSH and SOD in all the groups. Antioxidants may be administered following breeding during natural oestrus or induced oestrus to increase the conception rate through embryonic protection from oxidative stress in repeat breeder cows under field conditions.

Synchronization of ovulation and conception rate in postpartum buffaloes during peak and low breeding seasons using ovsynch with CIDR protocols

- ✦ Synchronization of ovulation is a recent reproductive tool to augment fertility in bovines. A total number of 140 graded Murrah buffaloes were randomly and equally divided into seven experimental groups I to VI (Treatment groups) and Group VII (Control group) during peak breeding season (PBS; between October and March) and low breeding season (LBS; between April and September). Buffaloes of group I and II were treated with Ovsynch protocol (10 µg of GnRH on day 0, 500 µg of PGF₂α on day 7 and another 10 µg of GnRH 48 hours after (day 9) the PGF₂α) and timed artificial insemination at 16 to 18 hours after (day 10) the second GnRH injection). In groups III and IV, in addition to the Ovsynch treatment, CIDR was inserted intra-vaginally, In group V buffaloes, 8 days before the start of Ovsynch treatment, 500

µg of PGF₂α was injected intramuscularly to all the buffaloes (- d 8). Two days later (- d 6), each buffalo was given intramuscularly 10 µg of GnRH (1st GnRH) and Ovsynch protocol was started 6 days after the first GnRH injection (d 0). The treatment procedures of group V were followed in the buffaloes of group VI. Additionally during the Ovsynch treatment from d 0 to d 7 all the buffaloes were treated with CIDR intra-vaginally. Group VII buffaloes (control) were observed for the signs of estrus for 30 days from the time of selection and artificial insemination was done during the observed estrus. Synchronization of ovulation programmes in postpartum buffaloes yielded 58.56 and 40.00 per cent overall conception rate during PBS and LBS, respectively. The cost per overall first and second service conception in groups I, II, III, IV, V, VI and VII in PBS was ₹7,410.00, 7,492.00, 6,425.00, 4,637.00, 3,708.00, 3,432.00 and 15,304.00 and in LBS, it was ₹16,683.00, 16,821.00, 12,887.00, 9,092.00, 7,792.00, 6,744.00 and 26,206, respectively. Presynch + Ovsynch + CIDR + mineral mixture protocol is recommended to achieve maximum conception rate in buffaloes.

Development of microencapsulated iron fortified yoghurt

- ✦ Microencapsulated whey protein-chelated iron (Fe-wp) using two iron sources viz., ferrous sulphate and ferrous lactate by emulsion method employing sodium alginate as the coat material were used to fortify yoghurt with microencapsulated iron. Seven treatments of ferrous sulphate fortified yoghurt were prepared at a level addition of 20 mg(PFSY1) and 40 mg(PFSY2) plain iron and incorporation of 20 mg(MFSY1), 40mg(MFSY2), 60 mg (MFSY3), 80 mg (MFSY4), and 100 mg(MFSY5) of whey protein-chelated microencapsulated iron per kg of yoghurt. Similarly another seven treatments of ferrous lactate fortified yoghurt were prepared and designated as PFLY1, PFLY2, MFLY1, MFLY2, MFLY3, MFLY4 and MFLY5. The chemical composition, physico-chemical properties, organoleptic evaluation, microbiological properties, textural properties of control and different treatments of yoghurt were carried out during different storage period. The cost of production of 1 litre of micro encapsulated ferrous sulfate fortified yoghurt and microencapsulated ferrous lactate fortified yoghurt were ₹ 72.34 and ₹ 73.84 respectively while it was ₹ 48.10 to produce 1 litre of control yoghurt. Microencapsulated whey protein chelated iron can be incorporated up to a level of 80 mg per litre of



yoghurt without altering the accepted appearance and taste, which can contribute to alleviating iron deficiency but requires scaling up, quality control and distribution through normal trade channels to have a sustainable impact.

Efficiency of different estrus detection techniques in buffaloes in an organized farm

- ❖ Different methods of heat identification in buffaloes were compared in an organised farm. Heat symptoms, vaginal smear examination, vaginal scope examination and camera method were included in the study. Among the techniques studied behavioural science clubbed with vaginal smear examination was considered to be ideal methods of heat identification in buffaloes.

Optimization of cattle manure treatment techniques for improving manurial value for fodder production

- ❖ Improved, vermicompost and enriched methods had higher carbon sequestration potential than inorganic fertilizer and farmers practices. Fodder maize had significantly higher soil carbon sequestration potential and carbon assimilation potential than fodder cowpea. Improved, Vermicompost, Enriched and Inorganic fertilizer treatment had higher green fodder yield in both fodder maize and cowpea. Carbon assimilation potential was higher in improved method, followed by enriched and vermicompost treatment methods. Out of four manure treatment techniques evaluated, improved and vermicompost methods was found to be better in terms of manure nutrient value, soil carbon sequestration and yield of fodder crops.

Optimization of artificial insemination technique in Large White Yorkshire pigs

- ◆ The overall mean semen volume in Large White Yorkshire boar was 208.92 ± 2.52 ml. The overall mean sperm concentration and total sperm count were 314.99 ± 3.58 million/ml and 65.84 ± 0.94 billion respectively. The litter size at weaning in natural service group, artificial insemination with neat semen, artificial insemination with diluted semen group with sperm dose of 3.6 billion and artificial insemination with diluted semen group with sperm dose of 1.8 billion were 8.08 ± 0.45 , 8.08 ± 0.34 , 8.50 ± 0.29 and 7.25 ± 0.30 , respectively. Season had a highly significant influence ($P < 0.01$) on litter size at weaning. Season had no influence on post-weaning estrus. Piglets of diluted semen group with sperm dose of 1.8 billion had highest weaning weight compared to the other three groups.

Optimization of carbon sequestration potential through fodder production

- ◆ CoCN_4 Hybrid Napier, sequestered higher carbon than desmanthus. Fodder maize sequestered higher carbon than fodder cowpea. Perennial fodder crops sequestered higher carbon than annual fodder crops.

Analysis of goat farming practices in southern agro-climatic region of Tamil Nadu

- ◆ Majority of the goat farmers were found to maintain non-descript goats (71.67%) in their herds and in Thoothukudi and Virudhunagar districts, Kodi adu goats (15%) and Kanni adu (13.33%) are predominantly reared. Non-availability of adequate grazing (41.67%), water (35%) and breeding stock (23.33%) were observed as managerial constraints in the study area. Semi-intensive system of rearing is found better in terms of optimum nutrient intake, optimum body weight gain, early age at first mating, early age at first kidding, less service period, optimum kidding interval and optimum kidding percentage.

Production of low-cost progesterone vaginal sponges for anestrus dairy animals

- ◆ Nearly 350 anestrus dairy animals throughout Tamil Nadu were induced to estrus by the use of progesterone sponge which is low cost method. This method is easy to adopt with reduced chance of infection and has a conception rate of 60 – 65%.

Nanocalcium particles on egg type chicken productivity

- ◆ Nanosized dicalcium phosphate was prepared by wet method using calcium hydroxide and orthophoric acid. Size of nanosized DCP prepared was found to be 11-17 nm. The nano DCP was supplemented to the layer chickens in the range of 0.44%, 0.88% and 1.76%. Feed intake, egg production and egg weight were not affected by feeding nano sized DCP. Egg shell thickness and egg breakage strength were not significantly influenced by nano DCP. Supplementing nano sized DCP at 0.44% significantly ($p < 0.01$) decreased the egg shell thickness and egg breakage strength. Nano sized calcium supplementation to layers does not have any major advantage over the conventional calcium supplementation.

Production of Functional Milk With Micro encapsulated Hydrophobic Bioactive Compounds

- ❖ Microencapsulated functional milk with particle size of $90.26 \mu\text{m}$ was prepared incorporating α -Linolenic acid (ALA), Docosahexaenoic acid



(DHA), ferrous fumarate and α -tocopherol. Functional milk was given to bunnies orally at the rate of from 5 ml to 10 ml per bunny as age advanced. In the rabbit model, feeding of this functional milk increased the erythrocyte count, hemoglobin, PCV and MCV and also increased the storage form of iron in the liver. Supplementation of functional milk increased the plasma antioxidant status which help to protect the PUFA from oxidation and reduce the accumulation of free radicals in the tissues.

Synthesis and characterization of nanoselenium in broiler chickens

- ◆ Nanoselenium with particle size in the range of 15-40 nm could be prepared using starch, ascorbic acid and bovine serum albumin by a simple process in large scale. Nanoselenium supplementation at 0.15-0.3 mg/kg diet increased the body weight gain and improved the feed efficiency of broiler chickens than the organic selenium supplementation. Total antioxidant and immune status of the broiler chickens were enhanced by 0.3 mg nanoSe/kg that was similar to 0.3 mg organic selenium /kg supplementation. Meat quality characteristics (drip loss, lipid peroxidation and antioxidant capacity) were improved by nanoselenium supplementation at 0.15-0.6 mg/kg diet. Nanoselenium can be used as an effective form of selenium supplementation in broiler chickens at a level of 0.5-0.3mg/kg with improved performance and enhanced immuno protective function.

Genetic characterization and phylogenetic analysis of indigenous ducks of Tamil Nadu

- ◆ A research work was undertaken to study the socio-economic status of duck farmers to assess morphology and morphometry of indigenous ducks of northern districts of Tamil Nadu and to genetically characterize duck varieties. Phylogenetic analysis of six duck varieties through microsatellite markers revealed that Sanyasi and Keeri ducks had close relationship with each other and White Pekin and Muscovy ducks had longest genetic distance with Indian duck varieties. Genetic diversity is high among the duck populations studied which could be exploited for improving productivity. The duck varieties of Tamil Nadu, Kerala and Assam may be classified as distinct breeds.

Effect of dietary levels of calcium, carnitine and zinc on semen quality characteristics of cross-bred chicken

- ◆ An experiment was conducted to study the effect of dietary supplementation of calcium, carnitine,

zinc and their combinations on production performance viz. body weight, feed consumption and reproductive performance like semen quality and fertility for a period of five weeks with eighty adult cross-bred cocks and eighty adult cross-bred hens. The results revealed that inclusion of 2 per cent calcium, 250 mg/kg of carnitine, 100 mg/kg of zinc and their combinations in feed improved the sperm motility, concentration and fertility and reduced the dead and abnormality of sperms in cross-bred cocks.

Dietary valine supplementation on performance of broiler chicken

- ◆ The dietary valine supplementation in broiler diet on serum creatinine and serum uric acid revealed significant ($P < 0.01$) difference between the treatment groups. The T2 group (basal diet + 0.04 per cent valine) recorded the highest net profit per kg live weight (₹ 16.69) and net profit per bird (₹ 39.39), followed by T4 group (₹ 15.96 and ₹ 36.63, respectively). Based upon this study, it is concluded that supplementation of valine in broiler basal diet at the level of 0.04 per cent (T2 group) did not affect the production performance and significantly improved the breast and thigh muscle protein level and lowered the thigh and breast muscle cholesterol level of broiler meat in a cost effective way.

Utilisation of ruminal contents in formulation of Japanese quail feed

- ◆ Rumen contents and blood were collected from the slaughter house, and the former dried under sun and hot air oven to a moisture level of 11.7% and 12% respectively and the latter dried under sun to a moisture level of 7-8 %. The combination of dried rumen contents and blood (ratio of 2:1) was added in a compounded feed for quails, at various levels (5 %, 10 %, 15%, 20%, 25%, 30%). Addition of the combination of dried rumen contents and blood in place of soya bean as a protein source in Japanese quails is found to be suitable and will appreciably reduce the cost of Japanese quail feed.

Bio- preservation of meat using beneficial bacterial cultures

- ◆ Cell free extract of *Lactobacillus bulgaricus* was prepared and its antibacterial activity was evaluated against *Escherichia coli*, *Staphylococcus*, and *Lactobacillus bulgaricus*. The cell free extract *Lactobacillus bulgaricus* exhibited antibacterial activity against *Escherichia coli*, *Staphylococcus*, and *Lactobacillus bulgaricus*, as evidenced by no growth of these organisms in their respective media. The sub-project "Bio- preservation of meat



using beneficial bacterial cultures” will culminate in the development of a suitable technology to extend shelf life of chicken meat under refrigeration (Chilled conditions).

Development of Pet Food from Poultry Slaughterhouse By-Products

- ❖ A study on the development of pet food from poultry slaughterhouse by-products was undertaken. The developed pet food was evaluated for their nutritive and shelf life quality parameters. In the study pet food was prepared utilizing poultry by-product meal (viz. chicken head and feet) and cruciferous vegetable by-product meal (viz. cabbage and cauliflower) along with incorporation of suitable plant binders and animal fat to standardise the product to appropriate consistency. The proximate composition of the prepared pet food as feed basis for moisture, crude protein, ether extract, crude fibre, total ash, nitrogen free extract and metabolizable energy were 4.57%, 25.41%, 17.68%, 1.32%, 9.82%, 45.77% and 420.15 kcal/100g, respectively. The proximate composition of pet food on dry matter basis for crude protein, ether extract, crude fibre, total ash, nitrogen free extract and metabolizable energy were 26.63%, 18.52%, 1.38%, 10.29%, 43.17% and 422.28kcal/100g, respectively. The thiobarbituric acid value, tyrosine value and total viable count of the prepared pet food was in increasing trend and yeast and mould count could not be detected up to 50 days of storage period. The fatty acid, amino acid and mineral profile also indicated the importance of nutritive value in the developed pet food. The pet acceptability studies also revealed acceptability of the pet food by pets. The cost per kg of production of pet food was ₹70.

Assessment of nutrients in some livestock and poultry meat of Tamil Nadu

- ❖ The meat of adult animals/birds had significantly high cholesterol content than the meat of young animals/birds. The amino acid content of meat from native breed/strain/variety was more or less similar to the meat of foreign breeds. The meat obtained from our native breeds/strains/varieties of Tamil Nadu had higher quantities of polyunsaturated fatty acids and lesser quantities of cholesterol compared to foreign breeds.

Surveillance on Heavy Metal Residues in Muscle, Liver and Kidney of Sheep and Goat Slaughtered in Tamil Nadu

- ❖ A study was undertaken to evaluate the level of heavy metal residues (cadmium, chromium,

copper, iron, lead, nickel and zinc) in muscle, liver and kidneys of sheep and goat collected from industrial and non-industrial areas of selected districts in Tamil Nadu viz., Coimbatore, Cuddalore, Salem, Tirupur and Vellore at two distinct seasons (summer and rainy season). In India, FSSAI, (2011) has prescribed a specific standard for toxic heavy metals viz., cadmium (1.5ppm), copper (30ppm), lead (2.5ppm) and zinc (50ppm) whereas for other heavy metals viz., chromium, iron and nickel no specific standards are available. It is concluded that the study revealed that there is no toxic elements like cadmium, chromium, copper, lead, nickel and zinc above the permissible level prescribed by FSSAI (2011). This study will also help to fix standards for other metals like chromium, iron and nickel for which no standards are available in FSSAI, (2011).

Extension of shelf life of chicken meat patties using natural preservatives by application of hurdle technology

- ❖ Chicken patties from broiler meat were prepared by incorporation of essential oils as natural preservatives and application of additional hurdles namely vacuum packaging and in-pack cooking with the objective extending shelf life. Oat flour was selected for inclusion in the patties formulation for adjusting the water activity. Clove bud oil (CBO) (0.05%) and oleoresin rosemary (ORM) (0.10%) were selected to use in combination as natural preservatives in refrigerated storage (4±2oC). In refrigerated storage with different packaging types up to 45 days, the in-pack cooked samples had lower TV, TBARS and the microbiological count than other samples especially in vacuum packaging compared to aerobic packaging. It can be concluded that the essential oil combination of CBO at 0.05% and ORM at 0.10%, vacuum packaging and in-pack cooking system could be used as hurdles in the preservation of chicken patties to extend the shelf-life of chicken patties up to 5 days at ambient temperature and up to 45 days at refrigeration temperature storage. Clove bud oil (CBO) (0.05%) and oleoresin rosemary (ORM) (0.10%) essential oils could be used in combination as natural preservatives in chicken patties during refrigerated storage (4±2oC).

Development of functional meat product enriched with dietary fibre and omega-3 fatty acids

- ❖ Chicken meat balls from broiler meat were prepared and enriched with dietary fibre (DF) and omega-3 (n-3) fatty acid rich sources and the storage qualities were studied with the addition



of natural antioxidants. It is concluded that chicken meat balls could be enriched with DF by a combination of pearl millet, wheat, grape pomace, pomegranate pomace, carrot pomace and beetroot pomace and flax seed oil could be added at 5 per cent level in the chicken meat balls for fortification with n-3 fatty acids. Further, incorporation of Brazil nut was able to control the lipid oxidation, improving the lipid stability of the n-3 fatty acids enriched meat products and the products could be stored up to 21 days under refrigeration ($4\pm 1^\circ\text{C}$) and 90 days under frozen ($18\pm 1^\circ\text{C}$) storage.

Establishment of Modern Salem Black Goat unit and optimize the feeding standards for economical production in dry land tract

- ❖ A nucleus flock of Modern Salem black goat unit was established at Mecheri Sheep Research Station, Pottaneri, Salem district and a Modern goat shed has been constructed with raised platform for kids (42 sq mt) and pen area for adults (83 sq mt) with open run of (131 sq.mt) to house about 70 kids and 70 does.

Recommendations for feed and fodder requirement

Grazing animals: Protein supplement @ 1% of Body weight in addition to full day (8hr) grazing improves the Average Daily Gain (ADG) in Salem Black goat. Stall feeding: supplementation of concentrate feed containing 22% CP and 72% TDN at rate of 1.5% of body weight along with 2kg of tree leaves improves the ADG.

Biotech centre for fecundity genes

- ❖ Introgression of Madras Red ewes with NARI Composite rams initiated. 44 ewes have been covered. Synchronisation of estrum using



Synchronisation in Madras Red ewes for introgression

progesterone sponges was done and 40% response was observed. First generation crossbred lambs (16 Nos. NARI Composite x Madras Red) born. Introgression of FecB mutation can induce multiple births in Madras Red sheep, in which the twinning per cent is less than 0.5. Twinning will provide scope for better profit through more number of lambs produced.

Evaluation of Nutritive value of tree fodders in rabbits

- ❖ The average daily gain (ADG) on rabbits on feeding Kalyana Murungai (*Erythrina indica*) tree fodder (9.79 g) was comparable to *Desmanthus virgatus* (9.63 g). Hence, it could be used as complete replacement of *desmanthus* in rabbit feeding. Performance of rabbits on Subabul (*Leucaena leucocephala*) tree fodder was poor (6.24 g ADG) and prolonged feeding caused alopecia. Hence, the inclusion level should not exceed 50 per cent of dry matter intake in rabbits. Increased carcass yield in terms of dressing percentage was observed on tree fodder fed rabbits than *Desmanthus* fed group. The performance of rabbits on various tree fodders will be popularized to the rabbit farmers and the level of inclusion also be recommended to the farmers.

Precision nutrition through sex separate feeding to improve economic efficiency in broiler production

- ❖ Male broilers require more nutrients than female broilers in terms of crude protein, metabolizable energy, calcium and phosphorus. The grown out period can be reduced to one week in male broilers compared to female. Sex-separate feeding and maintaining optimum grow-out period of birds are two strategies that farmers can easily apply to increase the profitability of the farm. The grown out period can be reduced from 6 to 5 weeks in case of male broilers when compared to female broilers.

Influence of strain, age and system of management on the productive and reproductive performance of guinea fowl

- ❖ 14-16 weeks is the ideal age for marketing Guinea fowl for meat purpose owing to significantly ($p < 0.01$) higher body weight, better body weight gain, better feed efficiency and good carcass characteristics. Attained three peaks of production in a gap of 20-24 weeks upto 95 weeks of age. Pearl strain had significantly ($p < 0.01$) higher body weight and body weight gain upto sixth week of age and White strain showed significant



($p < 0.01$) increase from 8th to 20th week of age. White strain showed significantly ($p < 0.01$) higher pre slaughter live weight and per cent NewYork dressed weight compared to Pearl strain. Pearl strain had numerically better egg production and better fertility parameters compared to White strain. With regards to raising breeders for keet production, the Pearl strain has better lineage towards developing layer variety and White strain towards broiler variety.

Assessment of functional properties of emu oil

- ❖ Inclusion of graded levels of emu oil in Japanese quail feed didn't cause any variation in production parameters like body weight, feed efficiency and livability. However, significant ($P \leq 0.05$) difference in hen day egg production between 7 and 12 weeks was observed. Significant difference were also observed between different treatments in hatching parameters like infertile eggs, dead in germ, total hatchability percent and hatch weight of chicks. Inclusion of graded levels emu oil in feed in Japanese quail between 0 and 6 weeks of age resulted in significant difference ($P \leq 0.05$) eicosapentaenoic acid in quail breast meat and linolenic, eicosapentaenoic and docosahexaenoic acid in quail leg meat.

Clinics

Comparative Study of Radiography and Echocardiography in the Diagnosis of the Dilated Cardiomyopathy and Mitral Valve Disease in Dogs

- ❖ In thoracic radiography, the VHS showed cardiac enlargement having $VHS > 10.2$ in 85% ($n=7$) dogs suffering from both the DCM and MVD. VHS showed cardiomegaly in 84.61% ($n=11$) dogs suffering from DCM, while 83.33% ($n=5$) of dogs showed cardiomegaly according to VHS in MVD. Pulmonary edema was seen in 75% ($n=15$) of dogs animals suffering from both the diseases. The edema was seen in 80% ($n=12$) of dogs from DCM while 77.77% ($n=7$) of dogs had edema in MVD. Mitral valve mass or degenerative lesions were easily visualized with increased LA: AO ratio with mitral regurgitation in echocardiography of dogs suffering from MVD. Echocardiography was found to be superior to radiography in diagnosis and confirming heart disease.

Evaluation of Antibiotic resistant Mastitis in dairy cows

- ❖ The incidence of clinical mastitis at Madras Veterinary College Teaching Hospital was 9.57 per

cent, of which 1.90 per cent was acute mastitis and incidence in organized farm was 16.56 per cent, of which 11.08 per cent was acute mastitis. The incidence of resistant mastitis was 56.1 per cent. The predominant resistant causative pathogen was E.coli (50.64 per cent) followed by S.aureus (44.25 per cent) and MRSA (5.11 per cent). Highest incidence was observed in early stage of third lactation and hind quarters. Haemato biochemical changes were reduced Hb, PCV, TEC, leukocytosis with neutrophilia, lymphopenia, hypoalbuminemia and hyperglobulinemia. A significant increase in ALP and AST were observed in early lactation which might reflect the negative energy balance and fatty liver. In E.coli and S.aureus mastitis treated with amoxicillin+sulbactam, ceftriaxone, enrofloxacin and gentamicin showed uniform improvement in clinical mastitis. In MRSA mastitis, enrofloxacin was found to be highly effective in comparison to amoxicillin+sulbactam. Similar economic impact was observed in E.coli, S.aureus and MRSA mastitis.

Tissue Doppler echocardiography in acquired heart diseases of dogs

- ❖ The incidence of AHDs was found to be 0.37 per cent in the five semester study period. Labradors and Spitz were found to be commonly affected with DCM and MVD respectively. Older male dogs were found to be more commonly affected. The observed chief complaints included inappetence, exercise intolerance, abdominal enlargement, syncope and weakness. Tachycardia, ascites and murmurs were the common clinical signs in all the groups of AHDs. Haematological assessment showed no significant changes. Serum biochemical assessment showed significant hypernatremia in all groups except HCM. Radiographic signs of AHDs included cardiomegaly, pulmonary oedema and left atrial enlargement. Dogs with DCM and pericardial effusion had significantly elevated VHS and confirmed the presence of acquired heart disease. DCM dogs had characteristic ECG pattern of Atrial Fibrillation in 20.69 per cent cases and atrial flutter in 8.62 per cent of cases. In advanced DCM the atrial fibrillation was recorded. MVD dogs had normal sinus rhythm in 33.33 per cent of cases. Atrial enlargement, low voltage QRS complex, ST coving and ST depression were some of the morphological changes in ECG observed.

Clinicopathological evaluation of hyperadrenocorticism in dogs

- ❖ Prevalence of hyperadrenocorticism in dogs was found to be 0.09 per cent. Pituitary - dependent



hyperadrenocorticism (PDH) occurred more commonly. Animals of 5 to 10 years age group were mostly affected with male predominance. Dachshunds had the highest incidence followed by Labradors and Nondescripts. One rare case of Adrenal - dependent hyperadrenocorticism due to adrenocortical adenoma was recorded. Endocrine tests such as urine cortisol creatinine ratio (UCCR) was found useful as screening test and low dose dexamethasone suppression test (LDDST) was useful in diagnosing PDH. Ultrasonography was helpful in conjunction with the above tests in identifying adrenal lesions.

Clinical and endoscopic evaluation of bacterial pneumonia in sheep and goats

- ❖ The incidence of bacterial pneumonia in sheep and goats were 9.52 per cent and 8.69 per cent respectively. Petechiae, mucus secretion, increase in submucosal vessels and mucus plugs were appreciated through tracheobronchoscopy. There was increase in total cell count and neutrophils in BAL and the bacterial isolates obtained were *Pasteurella multocida*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*.

To evolve cost effective general anaesthetic protocol for various surgeries in cattle

- ❖ A trial was conducted in 30 clinical cases of cattle presented to the large animal surgery theatre and were subjected to general anaesthesia to study the isoflurane sparing effect of opioids. Butorphanol tartrate and buprenorphine hydrochloride were found effective to control peri and post operative pain in cattle and reduce the isoflurane intake during inhalation anaesthesia.



General anaesthesia in a Cow

Comparison of diazepam and midazolam as an adjunct to ketamine induction and isoflurane maintenance anaesthesia in goats

- ★ The study was conducted in 12 goats presented to large animal surgery out-patient unit, Teaching Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal for orthopaedic surgery under general anaesthesia.

Cardiopulmonary and stress response to low flow isoflurane anaesthesia with opioid analgesics in cattle

- ★ The study was conducted in 30 cattle presented to Department of Veterinary Surgery and Radiology for surgical interventions under general anaesthesia. Opioids (butorphanol and buprenorphine) used in the study had isoflurane sparing effect than acepromazine in guaifenesin premedication, ketamine induction and isoflurane maintenance anaesthesia in cattle

Plate osteosynthesis of diaphyseal fractures of radius, metacarpus, tibia and metatarsus using limited contact dynamic compression plate in small ruminants

- ★ A study was conducted in 22 clinical cases of goats and two sheep. MIPO technique was found to be suitable for long bone fractures in sheep and goats.

Extension

Consumption pattern of livestock products in rural and urban Tamil Nadu

- ★ Semi-log regression analysis for household consumption of milk revealed that monthly family income, education, family size and dummies for children in the family were found to be significantly influencing the consumption of milk in rural areas. In the urban areas, the factors which significantly influenced the consumption of milk were monthly family income, education and dummy for children in the family.

Economic impact of small holder dairy farms of Namakkal district

- ★ The study was conducted to assess the incidence, predisposing factors and quantify the economic losses due to mastitis in small holder dairy farms. Prevention and control of mastitis through paying increasing attention towards udder washing, animal washing, animal shed washing, correction of milking procedures and controlling environmental factors are economically feasible, rather than treating the affected animals.



Mobile Communication for Effective Livestock Development

- ★ The results of the research showed that majority of the livestock farmers belonged to middle age group and were males. Majority of them were literates, possessed small land holdings and had livestock farming as their secondary occupation. Majority of the livestock farmers had low level of annual income with medium herd size of 2 to 5 cattle / 6 to 15 sheep and goat, high level of experience in livestock farming, medium to low level of social participation and medium to high level of information seeking behaviour on livestock farming. Majority of the veterinarians belonged to young age group and were males. They had basic professional degree of B.V.Sc., with low to medium level of work experience. The livestock farmers possessed basic model of mobile phone and used Nokia brand phone while the veterinarians possessed multimedia phones and used Samsung brand. Majority of the livestock farmers used less than two models of mobile, subscribed GSM network and used mobiles since 2 years whereas majority of the veterinarians used more than two mobile phones, subscribed GSM network service and had upto five years of experience in using mobile phones.

A functional analysis of Krishi Vigyan Kendras of Tamil Nadu and Kerala

- ★ Most of the KVKs had medium to high level of technical achievement. The organisational effectiveness perceived by the SMS of Namakkal, Thrissur and Pathanamthitta KVKs were high. Both SMS of SU and NGO KVKs as well as Kerala and Tamil Nadu KVKs were identified as consultative organisation in most of the items of leadership process, motivational forces, communication process, interaction influence process, decision making process, goal setting process, control process and performance goals and training. The study revealed that 56.00 per cent of the farmers had favourable opinion regarding functioning of KVKs. The most important constraints expressed by the programme co-ordinators were post of subordinate staff lying vacant, no promotion channel for the staff and inadequate infrastructure facilities. In case of SMS, lack of assistants for clerical work, cumbersome administrative procedure and paucity of funds for extension work were expressed as serious constraints. Major constraints expressed by the farmers were no direct help in the form of inputs and non-availability of SMS at times

Impact assessment of Namakkal Chicken-1 on livelihood of rural farmers

- ★ Majority of the respondents adopted scavenging feed base supported with supplementary feeding practice. The respondents were aware of all the scientific management practices except postmortem of birds and control of parasites. In overall adoption, marketing was highly adopted followed by housing, feeding and health care practices. None of the respondents adopted hatching practice of eggs. Although all family members were involved in the activities of rearing Namakkal Chicken-1 it was dominated by men. The average cost-benefit ratio of the respondents was 1.96. Availability of chicks of Namakkal Chicken-1 at local market was the first and foremost constraint reported by the respondents. Availability and cost of feed and availability of veterinary services at door step ranked as other important constraints respectively.

Development of e-Courses for B.V.Sc. & A.H. Degree Programme

- ★ On line e-Contents for all 69 courses were developed in moodle and Offline e-contents developed in Portable moodle and made available in DVD's. Any time - anywhere learning facilitated. Online learning portal, www.elearnvet.net. First of its kind in veterinary education in India. E-courses developed were released on 15.06.2012 by the Hon'ble Director General, ICAR and Hon'ble Agricultural Minister, Government of Tamil Nadu. Lecture materials in downloadable audio files. Adjudged as Best NAIP project.

Others

Biotechnology Information System

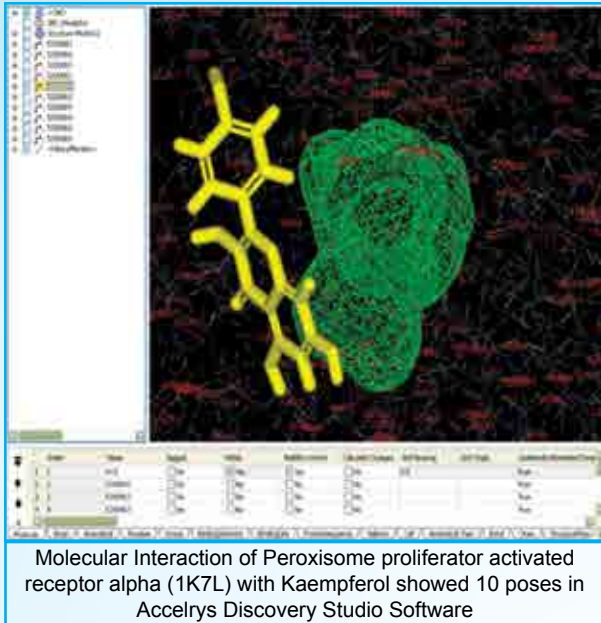
- ★ insilico docking analysis. Nucleotide sequence Analysis. Insilico screening of herbal bioactive principles and identification of active compounds of herbs are being done.

Insilico analysis of active principles present in *Gymnema Sylvestre* against insulin receptor on antidiabetic effect in type I and II diabetes

- ★ The current study tried to find out an efficient target for treatment of diabetes in human being by in silico analysis using molecular docking of active principles in a herbal plant *Gymnema sylvestre* (Cherukurinjan) with diabetic receptors. *Gymnemic acid* and *kaempferol* of *Gymnema sylvestre* showed interactions with amino acid residues at the binding sites of the target receptors. The current analysis provides an opportunity to



treat active compounds of *Gymnema sylvestre* as a potential drug target for the treatment of diabetes in future.



In silico analysis of binding capacity of flavanol to obesity receptor molecule by computational approach of small molecule protein docking method

- ★ Leptin is produced by adipocytes which binds to the Leptin receptor molecule in the body and controls the energy metabolism by regulating the food intake. Tea is used in traditional medicine to reduce body weight. The active component of tea is Catechin. In this study, binding capacity of catechin to obese receptor was analyzed by small molecule protein docking method. The results conveyed the binding ability of Catechin to Leptin receptor between residues 442 to 640. As this also happens to be the leptin binding region, there is a possibility for catechin to act as drug target for obesity. The findings could be used to produce new drug molecules using catechin as a lead molecule to treat obesity.

Food Sciences

Process optimization and shelf life study of retort processed milk beverages

- ★ Determination of F₀ value of flavored carrot, badam, rose milk in retort processing. Shelf life

study of flavored milk indicated that it could be used for 90 days without affecting sensory quality

Design of Automated Idli machine controlled by programmable logic controller (PLC)

- ★ Process standardization and optimization of suitable electro-pneumatic actuators of specification to execute holding, linear forward movement and positioning of idli tray into the steaming chamber and lid closing operations was done. Influence of ratio ingredients; moisture content of idli batter; method of cooking on physical properties of idli like cooking loss, porosity and shape index of idli and sensory evaluation and instrumental texture profile analysis of idli were studied and an idli machine has been fabricated.

Process optimization of retort processed kulfi concentrate

- ★ Shelf stable flax powder kulfi, fish powder kulfi could be produced by processing them in flexible non transparent pouches at F₀ value of 3.8 to 4.4. Sensory scores for color, flavor, and overall acceptability were within the acceptable range till the end of storage period.

Development of millet based icecream


- ★ Milk from kodo, pearl, foxtail and sorghum was mixed with varying quantities of buffalo milk for ice-cream preparation. The millet milk incorporated ice-cream showed lower carbohydrate (57.65 %) and milk fat (0.5%) contents whereas the protein (4.54 %)

Quality study on paneer and whey by different methods

- ★ Vacuum packaged paneer showed better shelf life than normal and hand sealing. Paneer prepared from 15% soy milk substituted in buffalo milk scored an overall acceptability of 8.8 equal to the control paneer in the sensory evaluation

Development of omega 3 fatty acid enriched paneer

- ★ Paneer was prepared with omega 3 fatty acid at the rate of 1%. Omega 3 enriched paneer showed better sensory quality and could be preserved up to 15 days at refrigeration temperature

The background is a gradient of light blue, transitioning from a pale blue at the top to a deeper blue at the bottom. In the lower half, there are several abstract, glowing light trails that curve and swirl, creating a sense of motion and energy. These trails are composed of multiple overlapping lines of varying thickness and brightness, ranging from a soft white to a vibrant blue.

COMMERCIALIZATION, TRANSFER, PATENTING OF TECHNOLOGIES



3. COMMERCIALIZATION, TRANSFER, PATENTING OF TECHNOLOGIES

Technologies Developed

Animal Health

- ◆ **Lateral flow kit for diagnosis bovine brucellosis** has been developed by the Central University Laboratory, Chennai for serodiagnosis of bovine brucellosis and found useful in screening the suspected herd.
- ◆ **Inactivated leptospira vaccine for bovines** has been developed by the Zoonoses Research Laboratory, Chennai to reduce loss of production/condition due to Leptospirosis.
- ◆ **Multiplex PCR kit** has been developed by the Department of Animal Biotechnology, Madras Veterinary College, Chennai for detection of avian oncogenic viruses.
- ◆ **A rapid test kit for rabies virus antibody screening** has been developed by the Department of Animal Biotechnology, Madras Veterinary College, Chennai.
- ◆ **Lateral flow strip kit** has been developed by the Department of Animal Biotechnology, Madras Veterinary College, Chennai for classical swine fever antigen detection.

Animal Production

- ◆ **Artificial Cloaca for Emu** (*Dromaius novaehollandiae*) has been developed by University Research farm, Chennai to perform artificial insemination in emu birds.
- ◆ **TANUVAS-URF- "Tattoo hammer for pigs"** has been developed by the University Research farm, Chennai for easy and simple identification system for pigs.
- ◆ **TANUVAS-URF- "Low cost automatic waterer for livestock"** has been developed by the University Research farm, Chennai to minimize has been tage of water; reduce space required minimizes the labour for providing water and also ensures hygienic availability of water at any point of time.
- ◆ **ICAR TANUVAS Chickuree**, a Chicken based extruded meat product has been developed by the Department of Meat Science and Technology, Madras Veterinary College, Chennai.

- ◆ **Retort Processed Chicken Products** has been developed by the Department of Meat Science and Technology, Madras Veterinary College, Chennai.
- ◆ **Fodder harvester cum chopper** has been developed by the Department of Dairy Science, Veterinary College and Research Institute, Namakkal.
- ◆ Technology on **Bio diesel production from rendered chicken fat** has been developed by the Department of Livestock Production and Management, Veterinary College and Research Institute, Namakkal as alternate fuel from dead birds.

Animal Husbandry Extension

- ◆ **TANUVAS-GoatES**-An user friendly microcomputer based expert system on goat Husbandry practices has been developed by Veterinary University Training and Research Centre, Vellore.
- ◆ **TANUVAS - Dairy Farming Technology Display Aids Kit (DFTD Kit)** has been developed at the Department of Animal Husbandry Extension and Entrepreneurship, Madras Veterinary College, Chennai.

TECHNOLOGY COMMERCIALIZED

- ◆ **TANUVAS - Dairy Farming Technology Display Aids Kit (DFTD Kit)** developed at the Department of Animal Husbandry Extension and Entrepreneurship, Madras Veterinary College, Chennai has been commercialized to Media Vision, Chennai on payment of lumpsum grant of ₹ 2.00 lakhs.





PATENTS FILED

Sl. No.	Name of the product	Scientists and the Department	Patent Application No.
1.	Recombinant <i>Saccharomyces cerevisiae</i> expressing exoglucanase gene from the fungi <i>Phaerochaeto chrysosporium</i>	Dr. K. Vijayarani, Dr.K. Kumanan, Dr.A. Thulasi and Dr.M. Chandrasekhariah Department of Animal Biotechnology, MVC, Chennai	1879/CHE/2013 Dt. 26.04.2013
2.	Biodiesel production from rendered chicken fat	Dr. John Abraham and Dr. V. Ramesh Saravana Kumar Department of Livestock Production and Management, Veterinary College and Research Institute, Namakkal	Docket No. 1336



Lateral flow kit for diagnosis of bovine brucellosis



Artificial cloaca for Emu



Lateral flow strip kit for classical swine fever antigen detection

EDUCATION





4. EDUCATION

EDUCATIONAL PROGRAMMES

Admission

The details of admission strength, number of students admitted, overall strength and number of students successfully completed pertaining to the regular courses during the year 2013-14 in TANUVAS are summarized below:

Courses	Admission strength	Admitted during 2013-14	Overall strength during 2013-14	Successfully completed during 2013-14
B.V.Sc. & A.H.	280	276	1208	199
B. Tech. in Food Processing Technology	20	20	78	18
B. Tech. in Poultry Production Technology	20	20	57	-
M.V.Sc.	121	86	172	49
M. Tech. (FPT)	5	5	5	3
Ph.D. (Veterinary)	98	34	134	31
Ph.D. (Food Technology)	3	2	3	-
M.Phil. in Biotechnology	8	1	2	2
M.Sc. Bioinformatics	3	-	-	-
PG Diploma in Bioinformatics	6	-	1	-
PG Diploma in Companion Animal Practice	6	1	2	-
PG Diploma in Veterinary Laboratory Diagnostic Technique	6	-	-	-
PG Diploma in Wild Animal Disease Management	6	-	-	-
PG Diploma in Business Management in Animal and Fisheries Science	6	4	6	-
PG Diploma in Diversified Poultry Production	30	-	-	-
Total	618	449	1668	302

TANUVAS is also offering the following PG Diploma courses under distance education mode to update the skills of field veterinarians on the latest technologies in veterinary science.

Sl. No.	Courses offered	Enrollment during the year 2013-14
1	Small Animal Orthopedics (PGDORT)	23
2	Veterinary Ophthalmology (PGDOPH)	2
3	Small Animal Dermatology (PGDSAD)	8
4	Small Animal Emergency and Critical Care Medicine (PGDECM)	18
5	Ethno Veterinary Practices (PGDEVP)	17
6	Feed Manufacturing Technology (PGDFMT)	6
7	Commercial Poultry Production and Management (PGDCPPM)	5
8	Diversified poultry production (PGDDPP)	--



9	Regenerative Medicine (PGDRM)	7
10	Small Animal Diagnostic Ultrasound (PGDDUS)	24
11	Zoonoses (PGDZ)	4
12	Bovine Infertility and its Management (PGDBIM)	6
13	Wild Animal Disease Management(PGDWADM)	9
14	Veterinary Clinical Laboratory Diagnosis(PGDVCLD)	8
15	Veterinary Endoscopy (PGDVEN)	2
16	Bovine Production Diseases (PGDBPD)	3
17	Advanced Reproductive Biotechnology in Animal Models(PGDARB)	2
18	Acaro-Entomology	--
19	Dairy Processing and Quality Assurance(PGDDPQA)	6
20	Post Harvest Technology and Quality Assurance of Meat and Meat Products (PGDQAMP)	1
21	Participatory Rural Appraisal (PGDPRA)	1
Total		152

Academic Research

During the year under report, 122 scholars registered for M.V.Sc. and Ph.D. programmes. The theses submitted by 85 scholars were accepted by the University for the award of M.V.Sc., Ph.D., M.Phil. degrees and PG Diplomas.

SCHOLARSHIPS

During 2013-14, a total of 1370 students were awarded scholarships to the tune of ₹ 160.46 lakhs. Collegewise details are furnished below :

Sl. No.	Name of the College	No. of students benefited	Amount (₹ In Lakhs)
1.	MVC, Chennai	813	116.91
2.	VC&RI, Namakkal	387	31.00
3.	VC&RI, Tirunelveli	42	4.86
4.	VC&RI, Orathanadu	89	3.44
5.	CFDT, Koduvalli	39	4.25
TOTAL		1370	160.46

CONVOCATION

The Sixteenth Convocation of the University was held on 10th September 2013 at Madras Veterinary College Campus, Chennai. The Chancellor of the University and His Excellency, The Governor of Tamil Nadu, Dr. K. Rosaiah, conferred the degrees and diplomas to 300 students and also distributed various prizes and 106 medals to 46 meritorious students, research scholars and N.C.C. cadets.



AWARD WINNERS FOR THE YEAR 2013

S.No	Name of the student	No. of medals	Name of the course	Name of the subject
1	Kathirvel, S	1	Ph.D.	Veterinary Surgery & Radiology
2	Rita Narayanan	1	Ph.D.	Dairy Science
3	Sulficar, S	1	Ph.D.	Veterinary Epidemiology and Preventive Medicine
4	Suresh Kumar, V	1	Ph.D.	Poultry Science
5	Saravanan, S	3	Ph.D.	Veterinary Microbiology
6	John Abraham	4	Ph.D.	Livestock Production and Management



7	Aruna, N.V	1	M.V.Sc.	Animal Biotechnology
8	Balamurugan, N	1	M.V.Sc.	Livestock Production and Management
9	Bathini Harsh	1	M.V.Sc.	Animal Nutrition
10	Bhaskar Vemu	1	M.V.Sc.	Veterinary Pharmacology and Toxicology
11	Chitrambigai, K	1	M.V.Sc.	Animal Husbandry Economics
12	Divyamol Thomas	1	M.V.Sc.	Veterinary Parasitology
13	Gopi, R	1	M.V.Sc.	Animal Husbandry Extension
14	Gopikrishnan, D	1	M.V.Sc.	Animal Reproduction, Gynaecology and Obstetrics
15	Jalantha, P	1	M.V.Sc.	Veterinary Pathology
16	Kathiravan, P	1	M.V.Sc.	Wildlife Science
17	Kodimalar, K	1	M.V.Sc.	Poultry Science
18	Preethi Unnithan	1	M.V.Sc.	Animal Husbandry Statistics
19	Rubinibala, B	1	M.V.Sc.	Veterinary Parasitology
20	Sobana, A.S	1	M.V.Sc.	Dairy Science
21	Suja, C.S	1	M.V.Sc.	Poultry Science
22	Keneisezo Kuotsu	1	M.V.Sc.	Veterinary Epidemiology and Preventive Medicine
23	Piyush Prakash	1	M.V.Sc.	Veterinary Anatomy
24	Ramachandran, A	1	M.V.Sc.	Animal Genetics and Breeding
25	Veerapandian, S	1	M.V.Sc.	Veterinary Microbiology
26	Mangayarkarasi, S	2	M.V.Sc.	Poultry Science
27	Nalini, P	2	M.V.Sc.	Dairy Science
28	Sivaprakasam, A	2	M.V.Sc.	Veterinary Clinical Medicine and Therapeutics
29	Ramakrishnan, K.S	3	M.V.Sc.	Veterinary Surgery and Radiology
30	Udhayavel, S	3	M.V.Sc.	Veterinary Microbiology
31	Prabu kumar, B	5	M.V.Sc.	Poultry Science
32	Ajidhaslin, S	1	M.F.Sc.	Aquaculture
33	Chandramani	1	M.F.Sc.	Fisheries Biology
34	Inam Akhtar Hussain	1	M.F.Sc	Industrial Fish Processing Technology
35	Kavitha, M	4	M.F.Sc.	Aquatic Environment Management
36	Mukdar Ali	1	B.V.Sc & AH	-
37	Bhuvana Priya, G	2	B.V.Sc & AH	-
38	Prakash, S	2	B.V.Sc & AH	-
39	Selvakumar, S	2	B.V.Sc & AH	-
40	Sumitha, P	3	B.V.Sc & AH	-
41	Mukesh Kumar Saini	4	B.V.Sc & AH	-
42	Philma Glora, M	6	B.V.Sc & AH	-
43	Rajesh Kumar Yogi	24	B.V.Sc & AH	-
44	Poonkodi, A	1	B.F.Sc.	-
45	Sujit Kumar	4	B.F.Sc.	-
46	Ragavi, G	3	B.Tech	Food technology



ENDOWMENTS

During 2013-14, the following endowments were instituted to encourage the students in academic activities.

Sl. No.	Name of the Endowment	Instituted by	Purpose	Endowment Amount (₹)
1.	SKGR Gold Medal	Dr. G. Vijayakumar, S/o. S.K. Govindarajan No.32, 5 th Cross Street, Rajaji Nagar, Pondicherry-605 008	Higher OGPA in Veterinary Clinical Medicine by B.V.Sc & AH student at VC&RI, Namakkal	1,00,000/-
2.	Dr.K.R.Gunasekar and Dr. R. Prabu Ram Sankar Optima Gold Medal	Dr.K.R. Gunasekar and Dr. R. Prabu Ram Sankar Optima Poultry Private Ltd., 12/9-3, Ramasamy Nagar, Civil Aerodrome Post, Sitra, Coimbatore-641 014	Higher OGPA in Veterinary Gynaecology and Obstetrics by M.V.Sc student at VC&RI, Namakkal	1,00,000/-
3.	Chef Jacob Aruni Endowment Award	Dr. A. Wilson Aruni, Asst. Prof., Loma Linda University, Department of Basic Sciences, Division of Microbiology and Molecular Genetics, 11021, Campus Street, Room 101, Loma Linda, California-92350	Best Outgoing M.V.Sc student in the subject of Livestock Products Technology	1,00,000/-
4.	Chancellor of TANUVAS Dr. K. Rosaiah Award	TANUVAS	Best Ph.D. student in Animal Production subjects	2,00,000/-

STUDENT AMENITIES AND ACTIVITIES

Hostel

During the reporting period, a total of 1182 UG and PG students were provided with residential accommodations in the constituent colleges of TANUVAS and the details are furnished hereunder:

Campuses	Students strength		
	Boys	Girls	Total
MVC, Chennai	360	180	540
VC&RI, Namakkal	201	156	357
VC&RI, Tirunelveli	47	31	78
VC&RI, Orathanadu	47	32	79
CFDT, Koduvalli	49	79	128
Total	704	478	1182

The Hostel Amenities Committee meets once in four months and review the functioning of the hostel. One part-time Medical Officer visits the hostel to attend to the health needs of the inmates.

University Students Counselling and Placement Cell (USCPC)

- ❖ USCPC website www.tanuvplacements.ac.in has been developed and functioning. Companies and students are requested to register in the USCPC website so as to make the placement activity simple and faster.
- ❖ During 2013-14, five Veterinary graduates got placement as SRF/JRFs in the projects functioning at TANUVAS
- ❖ University Students Counselling and Placement Cell (USCPC) functioning at MVC, Chennai facilitates to place the graduates in various organisations and the details are given below:

Sl. No.	Date	Name of the company	Selected candidates
Madras Veterinary College			
1	08.11.2013	Kemin Feed Industries, Chennai	3
		Sakthi Dairy (ABT Industries), Coimbatore	10
		Dakshina Kannada Co-operative Milk Producers Union Limited, Karnataka	3
		TCMPF (Aavin), Madurai	5
		Swathi Poultry Integration unit, Kolkatta	2



2	18.07.2013	Anbil Dharmalingam Agri College and Research Institute, Coimbatore	1
3	12.02.2014	M/s. Bengaluru Milk Co-operative union Ltd.	6
		M/s. Alembic Pharmaceuticals, New Delhi	1
		M/s. Srinivasa Hatcheries, Hyderabad	2
4	18.07.2013	Anbil Dharmalingam Agri College and Research Institute, Coimbatore	1
5	14.08.2013	Isquimen India Pvt. Ltd.	1
6	26.08.2013	Dr. Dog Pet Hospital, Hyderabad	1
7	02.09.2013	Hand in Hand India	2
8	02.12.2013	IIKM, Chennai for dairy farm at Kuwait	1
9	03.12.2013	Sun shine dairy, Malaysia	1
10	04.02.2014	Bangalore Milk Union Ltd, Bangalore	10
11	03.03.2014	Forum of Financial Initiatives (FII), New Delhi	2
		College of Food and Dairy Technology, Koduvalli	
12	03.02.2014	Aachi Masala	2
		Total	59

Library

Library facilities are available in all the constituent colleges of TANUVAS. Facilities like microfilming, reprography, E-mail, Information Retrieval through CD-ROM and databases are available. These libraries have been networked to national and international agencies so that the readers can have access to the resources of other libraries in the world and vice versa.



National Cadet Corps

Activities of National Cadet Corps- Remount and Veterinary Unit

Madras Veterinary College, Chennai

The senior division (SD) NCC, R&V coy 1 of Madras Veterinary College consisting of two companies commanded by a Company Commander Lt. (Dr) B. Suresh Subramonian and ANO Lt. (Dr) O.R. Sathyamoorthy are functioning with the allotted vacancy of 150 SD boy cadets and 50 SD girl cadets. The activities carried out by the NCC cadets during 2012-13 are furnished below:

- ❖ SUO Kamalanathan had won the RVC Maj. Gen. R.K.R. Balasubramanian award and Rolling cup for the year 2013 for best overall performance in NCC, academic and extra - curricular activities.
- ❖ UO K. Balamurugan participated in the National horse show conducted by Madras Riding Club on 6th & 7th April 2013 and he won bronze medal in the show jumping event.
- ❖ Guard of Honour was given to His Excellency Dr. K. Rosaiah, the Governor of Tamil Nadu and Chancellor of the University during the 16th Convocation on 10.09.2013. at Madras Veterinary College.
- ❖ 32 SD boy cadets attended the Combined Annual Training Camp conducted by 1 (TN) R&V SQN NCC at RVC Centre and College, Meerut Cantt from 17.09.2013 to 01.10.2013.
- ❖ 46 SD boy cadets and 26 SD girl cadets attended the Combined Annual Training Camp conducted by 1 (TN) R&V SQN NCC at Agarsen College of Arts and Science, Madhavaram from 18.09.2013 to 27.09.2013.
- ❖ SGT G. Srinivasan and SGT R. Vignesh participated in the prestigious Republic Day Camp-2013 at New Delhi from 26.12.2013 to 04.02.2014. Cadets took active participation in Prime Minister Rally. SGT R. Vignesh won the Gold medal and cash prize in Tent pegging. The participants were honoured by Government of India and Government of Tamil Nadu with cash prizes and gifts.
- ❖ Cadets took active participation in World Heart Day celebration at Madras Veterinary College, Chennai -7.



- ❖ During 2013-14, 37 SD cadets passed “C” certificate and 19 SD cadets passed “B” certificate examination.

Veterinary College and Research Institute, Namakkal

The 6/12 TN Battallion NCC (ARMY) units of VC & RI, Namakkal has a total of 50 cadets and they are undergoing regular military training and special corps training. The activities undertaken by the NCC cadets during 2013-14 are detailed below:

- ➔ Dr.S.Senthilkumar Assistant Professor, attended Selection Board Interview held at NCC Group HQ, Coimbatore on 31.01.2014 and was selected for commissioning.
- ➔ Road Safety Awareness Exhibition was organized by the NCC students on 13.03.2014.
- ➔ Eleven NCC cadets attended the Combined Annual Training Camp (CATC)
- ➔ Nine cadets appeared for NCC - ‘C’ certificates and 2 cadets for NCC -‘B’ certificates during the year 2013-14.

National Service Scheme

The NSS programme is being implemented at all the constituent colleges of TANUVAS with 750 vibrant student NSS volunteers .

During the year 2013-2014, eight NSS special camping programmes were conducted in eight NSS adopted villages, thus, fulfilling one of the major mandated NSS activities. NSS volunteers conducted Veterinary Health Camps, arranged free eye and dental camps and conducted competitions for school students in the adopted villages during the special camping programme.

Dr. S. Arulmozhi, Programme officer, Veterinary College and Research Institute, Namakkal participated in the orientation training programme for NSS officers conducted by Madras School of Social Work, Egmore, between 19.09.2013 and 25.09.2013. Five NSS Volunteers from CFDT, Koduvalli, have undergone training on “Youth Employability Skills” from 09.12.2013 to 13.12.2013 at Rajiv Gandhi National Institute of Youth Development, Sriperumbudur. During the reporting period, 668 tree saplings were planted and NSS volunteers donated 114 units of blood. Special events conducted by the NSS units are:

Madras Veterinary College, Chennai

- ➔ A “Cow Care Camp” was conducted at the Goshala attached to Sri Veeraragharaswamy Temple Thiruvallur on 08.09.2013. About 75 cows were vaccinated against Foot and Mouth disease,



dewormed against parasites and treated for ailments. Fertility check up was done for all the cows.

- ➔ In association with Department of Public Health, MVC, Chennai, the NSS unit conducted World Rabies Day on 28.09.2013 at Karunilam Village, Kancheepuram district. A total of 92 community dogs were vaccinated against rabies in the camp. An awareness camp on importance of preventive vaccination against rabies was also conducted during the camp. A total of 13 NSS volunteers participated in the camp.



- ➔ With the sponsorship of Ministry of Environment and Forests, Government of India, New Delhi, the NSS unit conducted Awareness Workshop on





Livestock Biodiversity on 01.03.2014 in which 75 NSS volunteers from various city colleges participated.

- The NSS unit conducted four special camps at Pudhur, Idaiyathur, Laxminarayana Puram and Easoor Villages from 03.03.2014 to 09.03.2014.

VC&RI, Namakkal

- In association with Department of Veterinary Preventive Medicine and Epidemiology and Department of Clinics, NSS volunteers organized anti-rabies campaign on 15.07.2013. A total of 54 dogs were vaccinated against rabies.
- The NSS volunteers conducted Rain water harvesting awareness rally at Namakkal on 12.08.2013.
- Gandhi Jayanthi was celebrated by NSS unit on 02.10.2013. Tamil Oratorical competition was conducted on the topic "Gandhi Kana Virumbiya India". Prizes were distributed to the winners.
- Yoga programme was organized for the students from 7.10.2013 to 24.10.2013 in collaboration with SKY trust, Namakkal, in which 29 NSS volunteers participated. Simplified physical exercise, kayakalpa yoga and meditation were taught to them.
- National egg day was celebrated on 11.10.2013 in which, NSS volunteers distributed 6000 eggs to the public and in-patients of the GH Namakkal.
- World Thrift Day was celebrated on 31.10.2013, in which an awareness programme was created among the NSS volunteers about the importance of saving money.
- On 25th of November 2013, Communal Harmony Week was celebrated by the NSS volunteers. As a part of the programme, NSS volunteers raised a sum of ₹ 1500/- and the same has been sent to National Foundation for Communal Harmony, New Delhi.
- Sixty six plant saplings were planted in VC&RI Campus, Namakkal on the eve of Honorable Chief Minister's 66th birth day celebrations with District Forest Department, Namakkal on 24.02.2014.
- 'World Women's Day' celebrated on 10.03.2014.
- Red Ribbon Club (RRC) – a special club for AIDS awareness was inaugurated on 10.03.2014.
- The NSS Students participated in CHAMP FEST '14 – a state level intercollegiate talent hunt for NSS volunteers organized by the NSS Unit of St. Joseph's College, Trichy on 13.03.2014. Six students have participated in various competitions and won prizes. Third year students Selvan. G. Saravanan and Selvi. V. Saranya got second prize in Tamil

elocution and Tamil essay writing respectively. Third year student Selvan. M. Divahar won third prize in slogan writing on AIDS awareness.

College of Food and Dairy Technology, Koduvalli

- World Environment day was organized by the NSS Volunteers on 05.06.2013 to create awareness on environment protection and distributed prizes to the winners of quiz competitions held on the same day.
- World Mental Health Day was celebrated on 10.09.2013.
- With the support from Marg Gregorious College, Mogappair, NSS unit conducted Veterinary Health Camp at Mogappair on 05.02.2014
- With the sponsorship of Ministry of Environment and Forest, New Delhi, 15 NSS volunteers participated in the awareness workshop on "Animal Biodiversity" on 01.03.2014 at University Research Farm, Chennai.

VC&RI, Tirunelveli

- Wildlife week celebration was organized at VC&RI, Tirunelveli. Rangoli and Tamil elocution competitions were organized and prizes were distributed to the winners.
- With the support from NIZHAL, an NGO, TREE WALK was organized for the NSS Volunteers on 15.03.2014 to create awareness on trees and different species identification.



Tamil Elocution

Student Association Activities

Student Association is actively functioning at TANUVAS and salient activities held during the reporting period are mentioned below:

- Ms. Meera Ramesh and Ms.R.Jasmin of IV B.V.S.C. of MVC, Chennai participated in the National Veterinary Physiology Quiz in Southern Zone Competition held on 08.10.2013 at Veterinary College, Hebbal, Bangalore.



- Inter-class cultural competition "ASTRA'13" was conducted from 02.10.2013 to 08.10.2013 at MVC, Chennai. There were 14 off-stage and 14 on-stage events (5 literary events, 11 fine arts and 9 performing arts apart from quiz, observational skills and treasure hunt). It was inaugurated by Thiru.C.Vetri Maaran, Film Director.
- College Day was celebrated on 09.10.2013 at the Anna Auditorium, Madras Veterinary College, Chennai. The overall championship was bagged by IV B.V.Sc. students.
- In the 5th Zydus All India drawing and painting competition conducted at VC &RI, Namakkal during 2013. Selvan. R.Hemasayee and Selvi. G. Thirumalisamy of VC&RI, Namakkal won prizes.
- Selvan. Rajeskumar Yohee and Selvi. P. Sumitha of VC&RI, Namakkal received first and second prize viz. Alembic X ceft and M ceft merit award for B.V.Sc. & A.H. outgoing students of 2012-13.
- Muthamizh Vizha was celebrated on 18.09.2013 at VC&RI, Namakkal.

Sports Activities

- Thiru. S. Dinesh Kumar IV B.V.Sc of MVC won the bronze medal in the Open National Fencing Tournament held at Maharashtra during August-2013.
- MVC won the SIVA MEMORIAL STANLEY CUP in the Inter Medical Cricket Tournament organized by the Stanley Medical College during September-2013.
- MVC participated in the Inter-Medical Collegiate sports and games meet - AADUKALAM-2013 organized by Kilpauk Medical College during Sept-2013. The following are the winners:
 - ◆ M. Sudarshan - Silver medal in Long Jump and 200 m and bronze medal in 100 m
 - ◆ J. Mohammad Ali - Silver medal in 400 m
 - ◆ G.Prakash - Bronze medal in 800 m
 - ◆ Athletic team-Gold medal in 4x100 m relay
- Thiru M.Praveen Kumar (I B.V.Sc) of MVC participated in the National Ball Badminton Tournament organized by Ball Badminton Federation of India from 19.10.2013 to 23.10.2013 at Bhilai, Chhattisgarh representing Tamil Nadu and won the Gold Medal in the 59th Junior National Ball Badminton Championship 2013-2014.
- College Annual Sports Day-2013 of MVC was celebrated on 09.10.2013 and the winners are as follows:
 - ❖ Individual Athletic Championship among Men for the year 2013-14 - M. Sudharsan



- ❖ Individual Athletic Championship among Women for the year 2013-14 - K.S.Sree Varsh
- ❖ Best Sportsman of the Year 2013-14 - K.Tamilselvan
- ❖ Overall Championship for the year 2013-14 - Final Year B.V.Sc. & AH students
- MVC organized an Inter-Collegiate Hockey tournament in memory of Dr. Porchezian among city professional colleges from March 20 - 22, 2014 at MVC and MVC bagged the Runners up trophy.
- Annual Sports day of VC&RI, Namakkal was conducted on 17.09.2013. Third year B.V.Sc. & AH students won the overall Championship of the year 2013-14. The individual winners are as follows:
 - ❖ Best Sports Man of the year - S.Vetrivel
 - ❖ Best Sports Women of the year - R.Baby Usha
 - ❖ Individual Champion among Men - D.Sathish kumar
 - ❖ Individual Champion among Girls - P.Sathiya
- Sports day was celebrated on 30th August 2013 at CFDT, Koduvalli. All the indoor and outdoor games, group events and athletic events were conducted for both boys and girls.
- First Annual Sports Meet of VC & RI, Orathanadu was celebrated on 25.06.2013. The winners and runners of the sports, games and track events were awarded with certificates and medals.
- TANUVAS Football team participated in the All India South Zone Inter-University football Tournament (AIU) organized by Mahatma Gandhi University, Kottayam and won the first round and reached the second round knock out match.

HONOURS / AWARDS



5. HONOURS / AWARDS

Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
1	Aishwarya S., J. John Kirubakaran and N. Daniel Joy Chandran Bhanu Rekha V., L. Gunaseelan, Kaja Abbas, K. Porteen and S. Balakrishnan Bhanu Rekha V. and L. Gunaseelan Chandrasekaran D. Dilli Babu V., J. John Kirubakaran and N. Daniel Joy Chandran Thiagarajan S., J. John Kirubakaran and N. Daniel Joy Chandran	Best poster presentation - First prize Best Poster presentation - First prize Best Poster presentation - First prize Best poster presentation Best poster presentation - Second prize Best oral presentation	Certificate TANUVAS	Poster on "Neutralisation of Newcastle disease virus in field samples of Avian Infectious Bronchitis" Poster on "Can reverse zoonoses of <i>Mycobacterium tuberculosis</i> occur through dairy animals become a potential hazard?" Poster on "Establishing emerging trend of <i>Mycobacterium tuberculosis</i> in bovines in an abattoir based study" Poster on "Improved reduction of bacteria from milk sample by nano particle based magnetic separation and PCR" Poster on "Study of antibiotic resistance and virulent genes of <i>Escherichia coli</i> isolated from dairy cows with mastitis" Abstract on "Detection of <i>Salmonella</i> Serotypes of poultry importance using a real time multiplex PCR Assay" - Presented at the International Conference on "Emerging and transboundary diseases of global importance" held at MVC, Chennai
2	Amritha V., S. Senthil kumar, A. Kumaresan, A. Arivuchelvan, K. Jayakumar and S. Dharmaceelan Aswar Netra, M. Sekar, K. Porteen and L. Gunaseelan Dharmaceelan S., K. Jayakumar, S. Senthil kumar, A. Kumaresan, Saloni. C. Joshi, V. Amritha and S. Kathirvel Kathrivel S., N. Rajendran, S. Dharmaceelan, M. Subramanian, G. A. Balasubramaniam and R. Thangadurai Saloni C. Joshi, A. Kumaresan, K. Jayakumar, S. Dharmaceelan, S. Senthil kumar, S. Sivaseelan and V. Amritha	Appreciation award Appreciation award Appreciation award Gold medal Gold medal Appreciation award Appreciation award	Certificate Indian Society for Veterinary Surgery	Article on "Ventilometric studies during isoflurane anaesthesia in cattle" Poster on "Leptospirosis: Re-Emerging Public Health Risk" Abstract on "Surgical management of thoracic wound in a Kathiawari horse" Article on "Pericardiostomy for the management of suppurative form of traumatic pericardiatis in 8 cattle" Article on "Thoracotomy under general anaesthesia in 26 cattle" Article on "Combination of radiography and ultrasonography in the diagnosis of thoracic disorders in 38 cattle" Article on "Surgical management of seminoma in a dog" - Presented at XXXVII Annual Congress of Indian Society for Veterinary Surgery and National Symposium held at KVASU, Kerala



Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
3	Arthanari Eswaran M.	Dr. B.V. Rao Poultry/ WPC' 96 Research Grant Award	Certificate and Cash B.V.Rao Research Foundation, Pune	Ph.D. Research on "Isolation, identification and molecular characterization of avian metapneumovirus (aMPV) in chicken"
4	Baranidharan G.R.	Best Clinical article	Certificate Intas Polivet	Paper on "Endoscopic diagnosis and retrieval of metallic cap in a dog" - published in Intas Polivet during 2013
5	Bathini Harsh, C.Valli, V.Balakrishnan and P.S.L.Sesh Mathialagan P. Pugazhenthir T.R. Ramesh J. Selvakumar K.N., M. Prabu, A. Serma Saravana Pandian, G. Senthilkumar, S.Selvam and B. Jaya Varathan Vimal Rajkumar N.	Best Poster Presentation - First prize Best poster presentation - Second prize Best poster - First Prize Best Poster Presentation - Second prize Best Poster Presentation Best poster presentation - Third prize	Certificates TANUVAS	Poster on "Strategic feeding of cotton gin waste for dairy cattle" Poster on "On-farm trial on increasing the quality of milk and prevention of mastitis - farmer participatory approach" Poster on "Use of certain preservatives in controlling Emerging Pathogens in raw milk" Poster on "Study on In vitro cytotoxicity of nano particle source for calcium, phosphorus and copper" Abstract on "Economic analysis on supply chain of milk" Poster on "Needs of dairy farmers in production and marketing" - Presented at the International Symposium on Dairy value Chain held at MVC, Chennai
6	Bharathidhasan A. Kathirvelan C. Vasanthakumar P.	Best oral presentation - Second prize Best poster presentation - First prize Best Oral presentation -Third prize	Certificate TANUVAS	Abstract on "Total phenolics, non tannin phenolics and total tannin content of commonly available forages for Ruminants" Poster on "Nitrate content in drinking water and green fodder samples and its correlation with incidence of nitrate toxicity in dairy cattle" Abstract on "Calcium and Phosphorous requirement for commercial broiler chicken" - Presented at the National Conference on "Current Nutritional Concepts for Productivity Enhancement in Livestock and Poultry" MVC, Chennai
7	Elango A.	Fellowship of Indian Dairy Association Marutha muthu Mariyae Award	Certificate Indian Dairy Association TANUVAS	Best contribution in dairy science Best contribution in teaching
8	Gnanalakshmi K.S.	Best Oral presentation-Second prize	Certificate SRM University	Abstract on "A Novel exopolysaccharide from <i>L.lactis ssp lactis</i> and its application for low fat Dahi" - Presented at the 5 th National Conference on Future Prospects in Food Processing and Quality Assurance



Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
9	Gayathri K., R.C.Rajasundaram, P.Selvaraj and A.Methai	Best Clinical case presentation – First prize	Certificate TANUVAS	Case study on "Termination of unwanted pregnancy in a bitch using aglepristone and misoprostol"
10	Gokulakrishnan M.	Best clinical case presentation - First prize	Certificate TANUVAS	Case study on "Horn fracture and its management in cattle"
11	Hariharan T.	Best Poster Presentation	Certificate TANUVAS	Abstract on "Effect of microbial protease on carcass characteristics and economic performance in Japanese Quails (<i>Coturnix coturnix Japonica</i>)"
12	Kanagaraju P.	Best oral presentation Best poster presentation Life time achievement award	Certificates TANUVAS Central Poultry Development Organization	Abstract on "Effect of <i>in-ovo</i> injection of glucose and egg white protein on the growth performance and intestinal development of Japanese quails" Abstract on "Effects of xylo oligosaccharides (XOS) from rice bran on growth performance, serum cholesterol and intestinal morphometry of Japanese quails (<i>Coturnix coturnix japonica</i>)" Popularizing backyard poultry and development of least cost incubator from old refrigerator
13	Kathirvelan C.	Best poster presentation – Third prize	Certificate Indian Dairy Association	Poster on "Production of conjugated linoleic acid (CLA) enriched designer milk by feeding vegetable oils in buffaloes"
14	Karu.Pasupathi	Best oral presentation	Certificate with cash Indian Society for Sheep and Goat Production and Utilization	Abstract on "Thyroid profile in rabbits fed cabbage waste with or without iodine supplementation"
15	Kumanan K.	Fellow of ISVIB 2013	Certificate The Indian Society for Veterinary Immunology and Biotechnology	For his long and meritorious service with purposeful contributions in the fields of Veterinary Immunology and Biotechnology
16	Mohan B.	Certificate of Appreciation	Citation Zonal Project Directorate, Bengaluru	Comprehensive and commendable performance for the successful conduct of KVK
17	Murugeswari R.	Best oral presentation Best poster presentation	Certificates TANUVAS	Abstract on "Effect of TANUVAS GRAND on milk production" Abstract on "Reducing feed cost by supplementing TANUVAS GRAND in dairy ration – A field report"
18	Palanisamy M., S.Manokaran, R.Madheswaran, R.Ezakial Napoleon, M.Selvaraju and K.Ravikumar	Best Poster Presentation	Certificate ISSAR	Poster on animal production Presented at XXIV Annual Convention of the Indian Society for Study of Animal Reproduction and National Symposium on "Frontier Reproductive Biotechnologies for Enhancing Animal Fertility and Fecundity: Global Perspective"



Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
19	Pandian C.	Best poster presentation	Certificate TANUVAS	Abstract on "Mortality pattern in Guinea fowl of an organized poultry farm"
20	Pazhanivel N.	Best Companion Animal Pathologist Best Poultry Pathologist	Certificates Indian Association for Veterinary Pathologist	Significant contribution to the companion animal pathology Significant contribution to the poultry pathology
21	Prabu K., M.Bojiraj, L.Gunaseelan and Netra B.Aswar	Best Oral Presentation	Certificate Global Public Health Conference (GPHCON) 2014	Abstract on "Studies on using honey as a preservative in raw milk samples"
22	Premavalli K.	Best oral presentation	Certificate TANUVAS	Abstract on "Effect of supplementation of probiotic - Bio-green* 1A at different concentrations on growth performance of Nandanam Guinea fowl-1"
23	Punnamurthy N.	Best Poster Presentation - Third prize	Certificate TANUVAS	Abstract on "Effect of herbal preparation on the management of clinical mastitis in Jersey cross cows"
24	Radhakrishnan L.	Best research article	Certificate and cash Indian Society of Sheep and Goat Production and Utilization	Article on "Evaluation of mango peel waste : Tapioca thippi urea blend in complete ration of lamb"
25	Raja A.	TANSA - 2012 for Veterinary Science	Certificate and Cash Tamil Nadu State Council for Science and Technology	For the achievements in Veterinary Science
26	Ramakrishnan V.	Rashtriya Vidya Gaurav Gold Medal Rajiv Gandhi Excellence Award	Gold medal and Certificate International Institute of Education & Management Citation and Certificate Indian Solidarity Council	Outstanding achievements and remarkable role in the field of education Outstanding achievements in the field of veterinary
27	Ramesh Saravanakumar V.	National fellow of ISAPM	Certificate Indian Society of Animal Production and Management	Outstanding achievement in the field of Livestock Production and Management
28	Richard Churchil R.	Best oral presentation	Certificate NAARM, Hyderabad	Abstract on "Agro biodiversity management for sustainable rural development" - Presented at the National conference on Agro biodiversity management for sustainable rural development conducted by NAARM, Hyderabad
29	Rita Narayanan	Best Oral Presentation	Certificate TNAU	Abstract on "Emerging Technology in Processing and value addition of millets for better utilization"



Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
30	Robinson.J.J. Abraham, V. Appa Rao, R. Narendra Babu, S. Ezhilvelan and Vasanthi Suresh	Team Award	Citation Indian Society of Agricultural Engineers	Significant achievement in "Assessment of harvest and post harvest losses of major crops and livestock produce in India"
31	Sangaran A.	Best paper Presentation Best oral paper	Certificate AIIMS, New Delhi Scroll and Certificate SRM University	Paper on "Comparison of IHA and LAT in detection of human hydatidosis" Paper on "Hydatid Cyst in Liver: A case report"
32	Sarathchandra G.	Fellowship Society of Toxicology	Citation Society of Toxicology	Excellence in Toxicology
33	Sarath T. Sesh P. S. L. Suresh P. Pugazhenthir T.R.	Best oral presentation Best Oral Presentation - Second prize Best oral presentation Best Research Paper Presentation - 1 st prize	Certificate Certificate Shield and Certificate Indian Veterinary Association	Abstract on "Modified marcenac approach caesarean section in a miniature jennet (<i>Equus asinus</i>)" Abstract on "Biochemical profile of sheep ovarian follicles at different stages of folliculogenesis" Abstract on "Detection of serotype 1 Marek's disease virus in vaccinated flocks" Abstract on "Seasonal occurrence of <i>Yersinia</i> species in dairy products in Chennai city of Tamil Nadu" - Presented at 5 th Kerala Veterinary Science Congress held at Kerala
34	Srividhya S., P.Kumarasamy, S. Giriprashanthini, B.Dhivya, P.L. Sujatha and S. Sureshkannan	Best Paper Presentation	Certificate Prof. Dhanapalan College of Arts and Sciences, Chennai	Paper on "A Bioinformatics approach to study the anti-cancerous property of <i>Phyllanthus emblica</i> "
35	Sundaresan A.	Best poster	Certificate TANUVAS	Abstract on "Micro-encapsulation of probiotics" - Presented at the Seminar on Sustainable food system for food security and nutrition
36	Suresh R. V., B. Gowri, S. Hamsa Yamini, P.Pothiappan and P.S. Tirunavukkarasu Potheiappan P., M. Thangapandiyan, K. Sridhar, B. Nagarajan, S. Kavitha, and A. P. Nambi Shijusimon M., R. Ramprabhu, G. D. Rao and S. Prathaban Sumathi D., P. Potheiappan, M. Venkatesh, K. Jayaraja and A. P. Nambi	Best paper presentation - First prize Best paper presentation - Second prize Best paper presentation - Third prize Best paper presentation - Second prize	Certificate TANUVAS	Case study on "Caecal impaction and its management in Kathiawari horse" Case study on "Guttural pouch emphysema and its emergency medical management in Thoroughbred horse" Case study on "Eye worm in a Pony and its surgical management" Case study on "Malignant thyroid carcinoma with liver and spleen metastasis in a Boxer dog" - Presented at TANUVAS -INTAS clinical case competition-2013



Sl. No.	Name of the institution / staff	Name of the award / honour	Type of Award / Awarding body	Details of the Award
37	Suresh Kumar V.	Dr.P.D.Sethi Annual Award-2012	Certificate M/s Anchrom Enterprises (I) Pvt. Ltd. Mumbai	Paper on "Application of TLC / HPTLC in Pharmaceutical Analysis, Standardization of Herbal Medicines and other branches of analytical chemistry"
38	Tensingh Gnanaraj P.	Best Farm Scientist Award - 2013	Citation & certificate TANUVAS	Best performance in farm activities
39	Usha S.	Bharatshiksba Ratan Award	Certificate and Trophy Global society for health & educational growth, New Delhi.	Excellence in Academic
40	Vishnupriya R., K.Sudha and K.S.Gnanalakshmi	Best poster presentation - Third prize	Certificate TANUVAS	Poster on "Development of Iron and Vitamin C fortified yoghurt drink"



Dr. A. Elango receiving Fellowship of Indian Dairy Association for his best contribution in Dairy science

DISTINGUISHED VISITORS





6. DISTINGUISHED VISITORS

Date of visit	Name of the Visitor	Place of visit
22.05.2013	Dr. P. A. Hamza, Associate Dean (Retd.) VCI inspection Committee member	Madras Veterinary College, Chennai
27.05.2013	Veterinary Council of India Team	Veterinary College and Research Institute, Tirunelveli
28.05.2013	Dr. Samuel Teresa, Melinda Gate Foundation, USA	Pharmacovigilance Laboratory for Animal Feed and Food Safety, Chennai
29.05.2013	Dr. Samuel Thevasagayam, Deputy Director, Bill and Melinda Gates Foundation, USA	Madras Veterinary College, Chennai
15.06.2013	Th.S. Manokaran, I.A.S. District Collector, Pudukkottai	TANUVAS Regional Research Centre, Pudukkottai
15.07.2013	Dr.Suresh Varma Kuchipudi, Lecturer in Molecular Virology and Immunology, University of Nottingham, UK Dr.C.Renugaprasad, Vice-Chancellor, Karnataka Veterinary, Animal and Fishery Sciences University, Bidar	Madras Veterinary College, Chennai
19.07.2013	Dr. R. Palaniswamy, I.A.S, Director, Department of Animal Husbandry and Veterinary Services, GoTN, Chennai	Veterinary University Training and Research Centre, Madurai
20.07.2013	Dr. Pat Blackall, University of New England, Australia	Poultry Disease Diagnostic and Surveillance Laboratory, Namakkal
29.07.2013	Dr.John Goolsby, Research Entomologist, Knipling- Bushland US Livestock Insects Research Laboratory, Kerrville, Texas, USA Dr.Alex Racelis, Assistant Professor, University of Texas, Pan American, USA	Madras Veterinary College, Chennai
05.08.2013	Dr.H.L.Shivaprasad, Professor, Avian Pathology, CAHFS, University of California, Davis, USA. Dr.S.Elankumaran, Associate Professor of Virology, Virginia - Maryland Regional College of Veterinary Medicine, Blacksburg, USA	Veterinary College and Research Institute, Namakkal
07.08.2013	Thiru K.P.P Basker, Hon'ble MLA, Namakkal constituency	Veterinary College and Research Institute, Namakkal
09.08.2013	Dr. Kynng Sun Kang, Ph.D., Director, Adult Stem Cell Research Centre, Seoul National University, Korea.	Madras Veterinary College, Chennai
16.08.2013	Dr.T.Madhanmohan, Adviser, Department of Biotechnology, New Delhi	Madras Veterinary College, Chennai
26.08.2013	Dr. Vijaya kumar, I.A.S., Secretary to Government, Animal Husbandry, Dairying and Fisheries Department, Govt. of Tamil Nadu, Chennai	Madras Veterinary College, Chennai
30.08.2013	Dr.P. Sudhakara Reddy, Registrar, Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh	University Research Farm, MMC, Chennai
13.09.2013	Dr. Patri Vergara, Professor, Autonomous University of Barcelona, Spain	Laboratory Animal Medicine, MMC, Chennai
16.09.2013	Dr. Sanda Barbosa and Feran Sarda, University of Barcelona, Spain	Madras Veterinary College, Chennai
13.11.2013	Th. S.Vinod Kumar, Assistant Secretary, Animal Welfare Board of India, Chennai	University Research Farm, MMC, Chennai
19.11.2013	Dr.G.Srinivasan, Deputy Director, Southern Region FSSAI (GOI), New Delhi	Madras Veterinary College, Chennai
10.12.2013 & 12.12.2013	Dr. Richard Reeve, Dr. Manikandan, Dr. Daniel Hayden and Dr. Taliana Lembo, Glasgow University, UK	Madras Veterinary College, Chennai and TANUVAS Head Quarters, Madhavaram



Date of visit	Name of the Visitor	Place of visit
21.12.2013	Dr.Suresh Honnappahole, Animal Husbandry Commissioner, Govt. of India, New Delhi	Veterinary University Training and Research Centre, Vellore
28.12.2013	Dr. P. H. Tank, Professor and Head, Dept. of Surgery, Veterinary College, Anand Agriculture University, Anand, Gujarat Dr. B. H. Gohil, Dy. Director of Animal Husbandry, Govt. Polyclinics, Bhavnagar, Gujarat	Poultry Research Station, MMC, Chennai
06.01.2014	Dr.Nanthagopal, I.A.S., District collector, Vellore	Veterinary University Training and Research Centre, Vellore
21.01.2014	Dr.Veerle Fievez, University of Veterinary Science, Belgium	Animal Feed Analytical and Quality Assurance Laboratory, Namakkal
22.01.2014	Dr.Ayonah Silva-Fletcher, Director, Royal Veterinary College, London, UK	Madras Veterinary College, Chennai
24.01.2014	Dr. Jill Maddison, Director of Professional Development, The Royal Veterinary College, London, UK Dr. Ayona Silva Fletcher, Director, Veterinary Education, The Royal Veterinary College, London, UK	University Research Farm, MMC, Chennai
29.01.2014	Shri S.R.Ramanan, Director, Regional Meteorological Centre, Chennai	Animal Feed Analytical and Quality Assurance Laboratory, Namakkal
31.01.2014	Tmt.S.Jayandhi, District Collector, Karur	Veterinary University Training and Research Centre, Karur
07.02.2014	Shri Santhosh Kumar Sarangi, I.A.S., Secretary, APEDA, New Delhi Shri Tarun Bajaj, General manager, APEDA, New Delhi	Animal Feed Analytical and Quality Assurance Laboratory, Namakkal
15.02.2014	Dr. Maarten Bode, Medical Anthropologist, Adjunct faculty Amsterdam Institute Social Science Research, University of Amsterdam	Veterinary University Training and Research Centre, Thanjavur
18.02.2014	Dr.Kamalasanan Pillai, Principal Scientist, National Azolla programme, Vivekananda Kendra, Kanyakumari	Veterinary University Training and Research Centre, Karur
22.02.2014	Mr.S.Nagarajan, I.A.S., District Collector, Kanyakumari District	Veterinary University Training and Research Centre, Nagercoil
19.03.2014	Dr.Joshi, Director, South Asia, IFPRI, New Delhi	Animal Feed Analytical and Quality Assurance Laboratory, Namakkal



Visit of Dr. Maarten Bode, University of Amsterdam at VUTRC, Thanjavur



Th. S.Manoharan, I.A.S., District Collector, Pudukottai visiting TANUVAS RRC, Pudukottai

WOMEN EMPOWERMENT





7. WOMEN EMPOWERMENT

TANUVAS is conducting several training programmes for empowering the rural women through Animal Husbandry activities. Some of the salient activities of TANUVAS in the area of women empowerment during the reporting period are listed below:

- ➔ Sixteen on-campus training programmes on Goat farming; Dairy farming and Fodder production were organised by VUTRC, Coimbatore for the benefit of 494 farmers inclusive of 154 women beneficiaries. Apart from this, 161 Off-campus training programmes on sheep and goat farming were organized by this centre exclusively for 11,086 women beneficiaries. Two special training programmes on Goat farming were conducted each for two days from 21.10.2013 to 22.10.2013 and



from 26.11.2013 to 27.11.2013 for the beneficiaries of Pudhu Vazhvu Project, Coimbatore. A total of 80 participants including 45 SC/ST women from Coimbatore and Tirupur districts participated and benefited.

- ➔ Ninety-four on and off-campus training programmes on profitable dairy farming; turkey farming; emu farming and goat farming were organized by VUTRC, Cuddalore for the benefit of 4602 farmers inclusive of 4383 women. One ATMA-Farm Field School on 'Profitable Quail Farming' was conducted at Aapathranapuram, Vadalur. A total of 25 farmers benefitted out of this programme.
- ➔ Twenty-five on-campus training programmes were organised by VUTRC, Dharmapuri on dairy cow



management; urea enrichment of sugarcane tops; goat farming; pig farming and backyard poultry keeping for the benefit of 928 farmers which included 539 women beneficiaries. A total of 98 off-campus training programmes were organized exclusively for 6602 women beneficiaries of Tamil Nadu State Government scheme on "Free distribution of milch cows to the poor families in rural areas". Fourteen special training programmes on clean milk production; cultivation of fodder crops; azolla demo; prevention of mastitis; feed formulation and fodder cultivation were offered to 1306 farmers inclusive of 465 women. In collaboration with Department of Agriculture, 33 off-campus training programmes were organized benefiting 1484 farmers inclusive of 976 women. Four farm schools with the financial assistance of ATMA were conducted at farmers field of Boochettihalli, Kettur, Mangarai and Harur of Dharmapuri district and 25 farmers registered for each farm school.

- ➔ A total of 111 on-and off-campus training programmes on dairy farming with value addition of milk; desi chicken rearing; sheep and goat farming; scientific livestock rearing and turkey rearing were organised at VUTRC, Dindigul benefiting 6476 farmers inclusive of 3611 women. This centre provided training on scientific goat rearing to 4334 women beneficiaries of Tamil Nadu State Government scheme on "Free distribution of goat/sheep to the poor families in rural areas".



- A total of 160 on and off-campus training programmes on dairy farming; goat farming; desi chicken farming; disease management; clean milk production and fish farming were organised at VUTRC, Erode benefiting 11,823 farmers inclusive of 10,885 women beneficiaries. With the sponsorship of ATMA, ASWAT NGO and NABARD frontline demonstration programmes on “silage making”, “Supplementation of TANUVAS Mineral Mixture” and “Supplementation of TANUVAS GRAND” were conducted for the benefit of the farming community.
- VUTRC, Karur conducted 54 on-and off-campus training programmes on Integrated Dairy farming, Scientific dairy farming and its management, Profitable goat farming and its management, Establishment of Korangadu pasture land in Karur District benefitting 2127 farmers inclusive of 664 women. Fifty-three training programmes were organized for 3655 beneficiaries of Tamil Nadu State Government scheme on “Free distribution of goat/sheep to the poor families in rural areas”. With the financial assistance of ATMA, five training programmes on Capacity building on scientific goat farming were conducted especially for women and 30 women benefited. With the financial assistances of Rural Self Employment Training Centre of IOB, Karur, two training programmes on Profitable Dairy and goat farming, and farm waste were also organized benefitting 17 women.



- VUTRC, Krishnagiri organized 212 on and off-campus training programmes on profitable dairy farming, turkey farming, emu farming and goat farming for the benefit of the 13588 farmers inclusive of 12790 women.



- Through 142 on-and off-campus training programmes organized by VUTRC, Madurai, 7025 rural participants including 5068 women were trained on dairy farming, goat farming, desi chicken farming, disease management, integrated livestock farming, disposal techniques of dead carcasses and preparation of value added milk, meat and fish products. With the sponsorship of ATMA, six off-campus training programmes were organized on “Recent Technologies to improve Milk Production” for 25 farmers. In collaboration with THAI – NGO, this centre organized a special training programme on “Dairy Farming” for 17 HIV positive women of Madurai District for their rehabilitation.
- A total of 17 on-campus training programmes on Quail farming for meat production, Intensive system of goat rearing, Avenues for animal husbandry and allied activities and Intensive system of goat rearing were organised at VUTRC, Melmaruvathur benefitting 425 farmers inclusive of 250 women. This centre organized 103 training





programmes for 3969 women beneficiaries of Tamil Nadu State Government schemes on “Free distribution of milch cow to the poor families in rural areas” and “Free distribution of goat/sheep to the poor families in rural areas”. Apart from these, under village upliftment programmes, five special trainings on Dairy farming and Integrated farming were organized by this Centre in Kadambur, Mathur, Anaikunnam, Thensiruvalur and Kiliyanagar villages benefitting 189 women.

- A total of 94 on-and off-campus training programme on preparation of concentrate feed for livestock, profitable sheep / goat and dairy farming and clean milk production were organized by VUTRC, Rajapalayam benefitting 4807 farmers inclusive of 3747 women. A total of 24 special training programmes on “Goat farming” and “Fodder development” were conducted for 2040 women beneficiaries of Tamil Nadu State Government schemes on “Free distribution of milch cows to the poor families in rural areas” and “Free distribution of sheep and goat to the poor families in rural areas”. An exclusive special training program on “Milk Products Preparation” was organized by VUTRC, Rajapalayam on 20.01.14 for entrepreneurs to develop skill and knowledge. A total of 31 participants attended the training and benefited.
- VUTRC, Salem organized 113 on-and off-campus training programmes on desi bird rearing; goat rearing; buffalo rearing; dairy farming; piggery rearing; broiler rearing; fodder production and value added milk production. The total number of women beneficiaries was 7287. Three village awareness camps were organized by this centre wherein 471 farmers participated inclusive of 261 women.



- Nineteen on-farm trainings on Conservation of native livestock and birds; Ethno Veterinary Medicine (EVM)-A remedy for primary health care of livestock; Dairy Farming with Ethno Veterinary Practices and Organic and sustainable agriculture were organized by VUTRC, Thanjavur for the benefit of 866 farmers inclusive of 107 women.
- A total of 33 on-campus training programmes were organized by VUTRC, Tiruppur on Goat farming; Desi chicken farming; FMD prevention and control benefitting 378 farmers inclusive of 39 women. A total of 128 off-campus training programmes on Goat farming were organised by VUTRC, Tiruppur for the 10,071 women beneficiaries of Tamil Nadu State Government scheme on “Free distribution of goats/sheep to the poor families in rural areas”. Under Microenterprise Development Programme (MEDP) with the financial assistance from NABARD, this centre organized five special training programmes on Goat rearing, Dairy farming and Desi chicken rearing to 160 SHG Women.
- VUTRC, Tiruvannamalai organized 21 on-campus training programmes on preventive measures of Foot and mouth disease; Goat farming; Livestock wealth; Desi chicken rearing; Recent advances in goat farming and Advanced Technologies in Green Fodder cultivation for the benefit of the 652 farmers inclusive of 201 women. This centre organized 257 off-campus training programmes on Sheep and Goat farming, and Dairy farming for



11829 women beneficiaries of Tamil Nadu State Government schemes on “Free distribution of milch cows to the poor families in rural areas” and “Free distribution of sheep and goat to the poor families in rural areas”.



- Eighty one on-and off-campus trainings were organized by VUTRC, Trichy on Dairy farming with fodder production, Sheep and goat farming, and Poultry farming with special emphasis to desi chicken benefiting 6338 farmers inclusive of 820 women.
- A total of 24 on-campus training programmes on livestock farming, backyard poultry farming, fodder development, low cost cattle feed computation using locally available feed ingredients, value added milk product preparation and ornamental fish farming were organised by VUTRC, Vellore and a total of 150 women benefited. This Centre conducted 203 trainings on scientific goat rearing to 11777 women beneficiaries of Tamil Nadu State Government scheme on “Free distribution of goat/sheep to the poor families in rural areas”.
- VUTRC, Villupuram organized 24 on-campus trainings on Dairy farming with fodder production, Sheep and goat farming, and Poultry farming with special emphasis to desi chicken benefiting 425 farmers inclusive of 185 women. A total of 52 off-campus training programmes were organised by this centre for 2476 women beneficiaries of Tamil Nadu State Government schemes on “Free distribution of milch cows to the poor families in rural areas” and “Free distribution of sheep and goat to the poor families in rural areas”.
- VUTRC, Nagercoil organized 9 on-campus trainings on White pig rearing; Backyard Poultry Rearing; Country Chicken farming benefiting 308 farmers inclusive of 60 women. A total of 49 off-campus training programmes were organised by this centre for 4408 women beneficiaries of Tamil Nadu State Government scheme on “Free distribution of goats/sheep to the poor families in rural areas”. With the sponsorship of HDFC bank, seven training programs on Livestock Rearing were conducted for the 238 Self Help Group Women.
- A total of 68 on-and off-campus training programmes on income generation through livestock farming; sheep and goat farming; desifowl farming and profitable turkey rearing were organised at Regional Research Centre, Pudukottai benefiting 2690 farmers inclusive of 1143 women.



- A total of 58 special off-campus trainings were provided to the 1951 women beneficiaries of Tamil Nadu State Government scheme on “Free distribution of goat/sheep to the poor families in rural areas”.
- A total of 128 on-and off-campus training programmes on scientific goat rearing, Japanese quail farming, integrated farming system, mushroom production, honey bee farming, freshwater fish farming and value added meat, poultry and fish products were conducted by the KVK, Kattupakkam benefiting 5042 participants inclusive of 1866 women beneficiaries. This centre organized 43 village awareness camps on animal husbandry activities wherein 3694 farmers participated.
- Krishi Vigyan Kendra, Kundrakudi conducted 141 on-and off-campus training programmes on desi bird rearing, reproductive management in dairy cows, backyard desi bird rearing, techniques on azolla cultivation, preparation of value added wheat products, value added ragi products and value added tomato products benefitting 3874 women.
- Krishi Vigyan Kendra, Namakkal conducted 72 on-campus training programmes on Agriculture; Horticulture; Animal Husbandry and Fisheries activities for 2822 beneficiaries. A total of 89 off-campus training programmes on Agronomy and animal husbandry activities benefitting 7021 women.
- On-campus (16) and off-campus (32) training programmes were organised by Farmers Training



Centre, Kancheepuram on feeding management in dairy cattle; management of infertility in dairy cattle; dairy cattle breed selection and breeding management benefiting 1728 women.

➔ Farmers Training Centre (FTC), Theni organized 32 on-campus and 86 off-campus training

programmes on different aspects of animal husbandry practices benefiting 5302 women.

➔ Forty four on and off-campus training programmes were conducted by FTC, Tiruvarur on different aspects of animal husbandry practices benefiting 1336 participants inclusive of 1061 women.



HUMAN RESOURCE DEVELOPMENT





8. HUMAN RESOURCE DEVELOPMENT

Faculty members of TANUVAS attended various Trainings / Summer schools / Short-term courses / Workshops / Seminars / National and International conferences within India as well as abroad during 2013-14 and the details are listed below:

Trainings

Name and Designation	Title of the Programme	Duration	Place
R.Venkataramanan and R.Saravanan Assistant Professors	Advances in statistical genetics	02.07.13 - 22.07.13	IASRI, New Delhi
J.Ramesh Assistant Professor	Triple Quad GCMSMS TSQ 8000 with Trace1310 GC	10.07.13 - 12.07.13	Demo Lab, Mumbai
S.Balasundari, Associate Professor	Recent advances in aquaculture for popularization through KVKs.	15.07.13 - 20.07.13	Central Marine Fisheries Research Institute, Kochi
P.Thirunavukkarasu Assistant Professor S.Saraswathi, T.Lurthu Reetha and C.Theophilus Anand Kumar, Assistant Professor and Heads	Professional skills for Trainers of extension institutes of Agriculture and Allied Departments	15.07.13 - 19.07.13	MANAGE, Hyderabad
N.Karthikeyan, N.Rani, S.Sivagnanam and V.Perasiriyam, Assistant Professors V. Ramesh Associate Professor	Teaching skills for agricultural university teachers	16.07.13 - 20.07.13	G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand
D.Balasubramanyam Professor K.Thilak Pon Jawahar Associate Professor & Head	Sustainable utilization of indigenous animal genetic resources of India	17.07.13 - 26.07.13	National Bureau of Animal Genetic Resources, Karnal
A.P. Nambi Professor and Head	ICT for capacity building in agricultural education	26.07.13 -27.07.13	Indian Agricultural Statistics Research Institute, New Delhi
L.Arun and R.Venkataramanan Assistant Professors C. Sreekumar, Professor	Artificial insemination in sheep	01.08.13 - 07.08.13	Central Sheep and Wool Research Institute, Avikanagar, Rajasthan
J.Selvaraj and R.Ramprabhu Professor and Heads	Management development programme on leadership development	26.08.13 - 06.09.13	NAARM, Hyderabad
K.Sivakumar and M.Kathirchelvan Associate Professor and Heads V. Palanichamy Professor and Head	Managerial skills for convergence in agricultural extension	26.08.13 - 30.08.13	MANAGE, Hyderabad
R.Selvaraj Professor and Head N.Akila and N.Vengadabady Associate Professor and Heads	Professional skills for trainers of extension institutes of Agriculture and Allied Departments	02.09.13 - 06.09.13	MANAGE, Hyderabad
M.Anna Anandh Assistant Professor M.Murugan Associate Professor	Advances in statistical methods for animal experiments	01.10.13 - 21.10.13	Indian Agricultural Statistics Research Institute, New Delhi



Name and Designation	Title of the Programme	Duration	Place
P.Veeramani and K.Suresh Kumar Assistant Professors	Advances in diagnosis, therapy and prevention of emerging and re-emerging diseases of livestock	08.10.13 - 28.10.13	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
J.Ramesh Assistant Professor	Inductively coupled plasma mass spectrometry (ICPMS)	09.10.13 - 11.10.13	Demo Lab., Mumbai
S.Ramesh Associate Professor and Head J.Johnson Rajeswar, A.Mohammed Safiullah, G.Ponnudurai, H.Gopi, Professor and Heads	Leadership for innovation in Agriculture	04.11.13 - 07.11.13	CSNIAM, Jaipur
A.Kalaikannan Assistant Professor G.Kathiravan and S.Malmarugan Associate Professors	Development of web application for agricultural information management	19.11.13 - 09.12.13	Indian Agricultural Statistics Research Institute, New Delhi
S.Gomathinayagam, Professor G.Ponnudurai Professor and Head	Strategies to control parasitic diseases in livestock and poultry under different managerial systems (National)	22.11.13	Veterinary College, Bangalore
R.Thyagarajan Associate Professor	Computational tools for animal genome resource data analysis	02.12.13 - 13.12.13	National Bureau of Animal Genetic Resources, Karnal
Bhaskaran Ravi Latha and V.Leela Professor and Heads	Communication and presentation skills (CAPS)	08.12.13 - 13.12.13	Goa
P.Shyam Babu and Mrs.C.Sharmila Bharathi, Assistant Professors G.Srinivasan, Professor	Professional skills for trainers of extension Institutes of Agriculture and Allied Departments	16.12.13 - 20.12.13	MANAGE, Hyderabad
A.Natarajan Professor and Head	Fundamentals of livestock meteorology (National)	16.12.13	College of Veterinary Sciences, Thrissur, Kerala
T.Senthilkumar and M.Palanisamy Associate Professors	Communicating science through mainstream media	17.12.13 - 26.12.13	NAARM, Hyderabad
A.Gopinathan and R.Velusamy Assistant Professors	Advanced teaching skills for university teachers	19.12.13 - 23.12.13	Pantnagar
T.Sarath Assistant Professor	Cloning research for quality buffalo production (National)	13.01.14 - 22.01.14	National Dairy Research Institute, Karnal
R.Mahaprabhu, K.T.Kavitha, K.M.Sakthivel, and M.S.Kannadhasan Assistant Professors	Work ethics for development professionals	20.01.14 - 24.01.14	MANAGE, Hyderabad
K.Kulasekar and A.Kumaravel Professor and Heads	Stress management	21.01.14 - 24.01.14	NAARM, Hyderabad
B.Dhanalakshmi and C.Ramani Professors	Managing change in government organizations	03.03.14 - 07.03.14	Goa
K.Rajendran and G.Raj Manohar Assistant Professors	Value-addition and post-harvest management of poultry products	20.03.14 - 27.03.14	Central Avian Research Institute, Izatnagar, UP

Workshops

Name and Designation	Title of the Programme	Duration	Place
C.Chandrasahnan Director of Extension Education	Sustainable innovation models and their prospective scaling up in animal husbandry sector as a collaborative venture with ATMA	22.05.13	Kerala Veterinary and Animal Sciences University, Wayanad



Name and Designation	Title of the Programme	Duration	Place
M.Babu, Director, Centre for Animal Production Studies	All India Co-ordinated Research Project on Agro forestry	25.05.13 - 27.05.13	CSKHPKV, Palampur
Geetha Ramesh, K.Balasundaram, B.Justin Williams, A.Kumaravel, S.Dharmaseelan and R.Ramprabhu Professor and Heads	Willed body programme and other humane alternatives in Veterinary Education	06.06.13	Bombay Veterinary College, Mumbai
G.Rathinasabapathy Deputy Librarian	Strategies for strengthening NARS Libraries Under eGranth (National)	05.07.13 - 06.07.13	IARI, New Delhi
G.Rathinasabapathy Deputy Librarian	Koha integrated library system	29.08.13	Central Plantation Crops Research Institute, Kerala
B.Mohan Professor and Head	Outscaling farm innovations (National)	03.09.13 - 05.09.13	NASC Complex, New Delhi
T.Sivakumar, Dean, College of Food and Dairy Technology	Research and development in food processing sector (National)	24.09.13	Mumbai
M.Thirunavukkarasu Controller of Examinations	Enhancing research collaborations through National Knowledge Network	17.10.13 - 19.10.13	Bangalore
G.Rathinasabapathy Deputy Librarian	Koha library management software (National)	25.10.13 - 26.10.13	Acharya NG Ranga Agricultural University, Hyderabad
M.Thirunavukkarasu Controller of Examinations N.Daniel Joy Chandran, P.Tensingh Gnanaraj and M.Selvaraju Professor and Heads	Vigilance in Government Offices, departmental proceedings for disciplinary authorities and those assisting disciplinary authorities and in handling such cases and functions of Io/Po, Mock, enquiry	21.11.13 - 23.11.13	Hotel The Connaught, New Delhi
M.Thirunavukkarasu Controller of Examinations	Cross cutting experiences in ICT	06.12.13 - 07.12.13	ICAR, New Delhi
G.Rathinasabapathy Deputy Librarian	Automated library & e-resources under NARS (National)	16.12.13 - 17.12.13	IVRI, Izatnagar
M.N.Sundararaman, Professor S.Panneerselvam, Professor and Head	Chromosome aberrations and infertility	04.01.14	NDRI, Karnal
T.Lurthu Reetha Assistant Professor and Head S.Ramakrishnan Associate Professor and Head	Institutional innovations for Agri-Extension for inclusive growth	17.02.14 - 22.02.14	NAARM, Hyderabad
G.Kathiravan Associate Professor V.Ramesh Saravana Kumar Professor and Head M.Thirunavukkarasu Controller of Examinations	Technology enhanced learning	14.03.14 - 15.03.14	NAARM, Hyderabad

Conferences

Name and Designation	Title of the Programme	Duration	Place
C. Pandian and K. Senthilkumar Assistant Professors Y. Krishnamohan Reddy Professor and Head	Thrust areas in veterinary research, education, regularity reforms and governance for quality services to farmers (International)	16.04.13 - 17.04.13	Institute of Animal Health & Veterinary Biological, Hebbal, Bangalore
C. Pandian, Associate Professor A. Elango, Professor and Head	Technological advances in super foods for health care (International)	03.05.13 - 04.05.13	Pondicherry University, Puducherry



Name and Designation	Title of the Programme	Duration	Place
Thanga Tamilvanan and H.Gopi Professor and Heads	All India Conference on Livestock and dairy development	11.06.13 - 12.06.13	Mahatma Mandir, Gandhinagar, Gujarat
P.Senthilkumar, Assistant Professor	Advances in biomedical and pharmaceutical nanotechnologies (International)	27.06.13 - 29.06.13	Anna University, Tiruchirappalli
M.Sutha Assistant Professor S.Sendur Kumaran Associate Professor M.Palanisamy Associate Professor and Head	Conventional & non-conventional organic inputs in agriculture (International)	16.08.13 - 17.08.13	Pondicherry
V.Appa Rao Professor	6 th Mayors Conference	13.09.13 - 14.09.13	New Delhi
C.Bandeswaran Associate Professor and Head	Agro biodiversity management for sustainable rural development (National)	14.10.13 - 15.10.13	NAARM, Hyderabad
M.Palanisamy Associate Professor and Head B.Mohan and P.Kumaravel Professor and Heads C.Chandrasasan Director of Extension Education	KVK-13 (National)	23.10.13 - 25.10.13	University of Agricultural Sciences, Bangalore
K. Sivakumar Associate Professor and Head C. Chandrasasan Director of Extension Education	Krishi Ghosthi / Kisan Mela Global Agri Connect 2013,	25.10.13 - 27.10.13	IARI, New Delhi
A. Balasubramaniam, P. Suresh and V. Senthilkumar, Assistant Professors T.R. Pugazhenthii and P.S.L.Sesh Associate Professors P.Sridevi and L.Nagarajan, Professors R.Ezakial Napoleon, S.C.Edwin and M.Chellapandian, Professor and Heads	5 th Kerala Veterinary Science Congress	09.11.13 - 10.11.13	Thrissur, Kerala
K.Krithiga and M.Thangapandiyan Assistant Professors N.Pazhanivel and G.A.Balasubramaniam Professor and Heads R.Thangathurai, D.Basheer Ahamed and P.Srinivasan, Associate Professor S.Ramesh Associate Professor and Head C.Balachandran, Professor and Head	30 th Annual Congress of the Indian Association of Veterinary Pathologists	21.11.13 - 23.11.13	College of Veterinary Science and Animal Husbandry, Bhubaneswar, Odisha
K.Shanthi Deputy Director of Physical Education	Physical education and sports science (International)	08.01.14 - 11.01.14	Manipal University, Karnataka
A.Sangan, Professor	Multidisciplinary healthcare AIIMS 14 (International)	11.01.14 - 12.01.14	All India Institute of Medical Sciences, New Delhi



Name and Designation	Title of the Programme	Duration	Place
M.G.Jayathangaraj Professor and Head	Preparedness to combat wildlife diseases in India	11.01.14	New Delhi
A.Bharathidhasan Assistant Professor	26 th Kerala Science Congress	28.01.14 - 31.01.14	KVASU, Pookode, Kerala
S.Eswari, Associate Professor and Head A.Mangala Gowri, Professor	Reproductive Health : Issues and strategies under changing climate scenario (International)	06.02.14 - 08.02.14	IVRI, Izatnagar, Uttar Pradesh
T.Selvaraj Assistant Professor	Climate change and sustainable management of natural resources (International)	12.02.14 - 14.02.14	ITM University Gwalior Campus, Sithouli, Madhya Pradesh
S.Manoharan Associate Professor	Progress in animal welfare and canine rabies control (International)	20.02.14 - 24.02.14	Bangalore

Seminars / Symposia

Name and Designation	Title of the Programme	Duration	Place
A.Thangavelu Professor	Emerging trends in biotechnology research for sustainable animal health and productivity (National)	08.04.13 - 10.04.13	IVRI, Izatnagar
G.Vijayakumar Associate Professor	Newer approaches in welfare and health management of captive and free ranging wild animals (National)	18.04.13	College of Veterinary Science, Bhubaneswar, Odisha
K.V.Venkateswaran and K.Mani Professor and Heads C.Veerapandian, Dean	Developing and embedding a problem based learning approach in Veterinary Curriculum (International)	26.04.13 - 27.04.13	Kochi
D.Anandha Prakash Singh Associate Professor D.Baskaran, Professor and Head	Changing scenario of dairy food safety and standards in the backdrop of FSSAI-Act 2006 (National)	26.04.13 - 27.04.13	Dairy Science College, Bangalore
D.Thyagarajan Director of Distance Education	ICT and future of distance education : opportunities and challenges (National)	27.06.13 - 28.06.13	B.R.Ambedkar Open University, Hyderabad
M.Siddharth, Assistant Professor	Colloquium on food engineering: present status and future possibilities	06.08.13	Central Food Technological Research Institute, Mysore
V.Appa Rao, Professor	Greening of meat and poultry processing sector	07.08.13	Panchsheel Bhawan, August Kranti Marg, New Delhi
G.Ravikumar, Professor	Control of zoonotic diseases - Raksha knowledge summit-13	16.08.13	Indian Immunologicals Limited, Hyderabad
M.Siddharth, Assistant Professor	Revitalizing Indian Agriculture innovations in agro processing and value chain (National)	23.08.13 - 24.08.13	NIFTEM, Kundli
V.Perasiriyan, Assistant Professor D.Ramasamy, Professor	Mechanized production of Indian dairy products (National)	02.09.13 - 03.09.13	Hotel Hilton, Sahar Airport, Andheri, Mumbai
K.M.Palanivel Professor and Head	New opportunities and challenges in microbial research (National)	05.09.13 - 06.09.13	Bharathidasan University, Tiruchirappalli
S.Senthilkumar, A.Arun Prasad, A.Velavan and A.Kumaresan Assistant Professors S.Kathirvel Associate Professor and Head T.N.Ganesh, S.Ayyappan, L.Nagarajan, R.Jayaprakash and C.Ramani Professors S.Dharmaceelan, Professor and Head	Need for specialization and super specialization in veterinary surgery and imaging techniques for professional efficiency development (National)	06.11.13 - 08.11.13	College of Veterinary and Animal Sciences, Thrissur, Kerala



Name and Designation	Title of the Programme	Duration	Place
D.Ramasamy and D.Baskaran Professor and Heads	Agribusiness and food processing (International)	06.11.13 - 07.11.13	Hyderabad International Convention Centre, Hyderabad
S.Manoharan Associate Professor K.Kumanan Director of Research	Emerging challenges & opportunities in veterinary immunology and biotechnology for improved animal health and productivity (National)	11.11.13 - 13.11.13	Palampur
M.Sundara Vinayaki Assistant Professor S.Jayachandran, Associate Professor S.Eswari Associate Professor and Head V.Leela, Professor P.Selvaraj, Professor and Head	Physiological and nutri-genomic interventions to augment food security and animal welfare (National)	19.11.13 - 21.11.13	College of Veterinary Science and Animal Husbandry, Mathura
C.Sreekumar, Professor	Ruminant vaccine adjuvants	26.11.13	Hyderabad
M.Babu, Director, CAPS	Challenges and strategies in making small and marginal farm holdings sustainable and profitable (National)	03.01.14 - 04.01.14	Centre for Good Governance, Hyderabad
S.Rangasamy, K.Ravikumar and V.Prabaharan, Assistant Professors T. Sathiamoorthy, Associate Professor M.Palanisamy Associate Professor and Head S.Usha Kumary and R.Anil Kumar Professors M.Selvaraju, R.Ezakial Napoleon, D.Anandha Prakash Singh and K.Kulasekar, Professor and Heads C.Chandrasanan, Director of Extension Education S.A.Asokan, Dean, MVC	Frontier reproductive bio-technologies for enhanced animal fertility and fecundity : global perspective (National)	08.01.14 - 10.01.14	Maharashtra Animal and Fishery Sciences University, Nagpur
S.Paramasivan, Associate Professor O.R.Sathyamoorthy, Professor and Head	Veterinary Anatomy Vision – 2050 (National)	08.01.14 - 10.01.14	Rajasthan University of Veterinary and Animal Sciences, Bikaner
P.Kumaravel Professor and Head	International dairy expo and cattle show	17.01.14 - 19.01.14	Chikodra, Anand, Gujarat
S.Vasantha Kumar, R.Murugeswari and A.Thennarasu, Assistant Professors J.Muralidharan, S.Ramakrishnan Associate Professors V.Ramesh, K.Sivakumar, P.Vasanthakumar, S.Meenakshi Sundaram and N.Kumaravelu Professors P.Mathialagan and K.Sivakumar Professor and Head T.Sivakumar, Dean College of Food and Dairy Technology	New dimensional approaches for livestock productivity and profitability enhancement under era of climate change (National)	28.01.14 - 30.01.14	Anand Agricultural University, Anand, Gujarat



Name and Designation	Title of the Programme	Duration	Place
R.Murugeswari Assistant Professor	Women Farmer (National)	04.02.14 - 06.02.14	Junagadh, Gujarat
K.T.Kavitha and N.Rani Assistant Professors K.Arunachalam, A.Meenakshisundaram and S.Arunkumar, Associate Professors M.Raman and C.Sreekumar, Professors Bhaskaran Ravi Latha, G.Ponnudurai, T.Anna and N.Jeyathilakan Professor and Heads	Towards food security through sustainable animal production and integrated parasite management (National)	05.02.14 - 07.02.14	Thrissur, Kerala
R.Saravanan Assistant Professor A.K.Thiruvnkadan Professor and Head	Harmonizing phenomics and genomics for sustainable management of livestock for upliftment of rural masses (National)	06.02.14 - 07.02.14	National Bureau of Animal Genetic Resources, Haryana
M.Chandrasekar, Associate Professor A.P.Nambi and M.G.Jayathangaraj Professor and Heads S.R.Srinivasan Director of Clinics S.Prathaban, Dean, VC&RI, Tirunelveli	The 21 st Century road map for veterinary practice, education & research in India & developing countries (International)	14.02.14 - 16.02.14	Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, R.S.Pura, Jammu and Kashmir
S.Manokaran, Assistant Professor D.Balasubramanyam, Professor M.Selvaraju, L.Radhakrishnan Professor and Heads	Sheep and goat biodiversity and breeding policies - issues and perspectives (National)	21.02.14 - 22.02.14	Krantisinh Nana Patil College of Veterinary Science, Shirwal, Nagpur

Overseas Training / Seminars / Conferences

Name and Designation	Title of the Programme	Duration	Place
A. Arunprasad Assistant Professor Sabiha Hayath Basha Professor	Stem cell and Regenerative Medicine	03.04.13 - 15.06.13	Virginia -Maryland Regional College of Veterinary Medicine, Blacksburg, USA
S.Meenakshi Sundaram Associate Professor P. Tensingh Gnanaraj Professor and Head	Livestock Technology and Farm Management	24.04.13 - 08.05.13	Galilee International Management Institute, Israel
A.Sangaran Professor	10 th World Buffalo Congress and 7 th Asian Buffalo Congress	06.05.13 - 08.05.13	Thailand
D.Chandrasekaran Professor and Head	World Veterinary Poultry Association 13	19.08.13 - 23.08.13	NANTES, France
A.K.Thiruvnkadan Professor and Head	Sustainable diets: human nutrition (International Symposium)	21.08.13 - 25.08.13	Ulaanbaatar, Mangolia
A.Sangaran Professor	World association for the advancement of veterinary parasitology (International Conference)	25.08.13 - 29.08.13	Perth, Australia
G.Sarathchandra Professor and Head	1 st International Mass Spectrometry School	15.09.13 - 20.09.13	Siena, Italy



Name and Designation	Title of the Programme	Duration	Place
R. Rajendran Professor	Marker Assisted Selection in Animal Sciences	15.10.13 - 11.01.14	Iowa State University, Ames, USA
P.Vasan Associate Professor	Dairy Nutrition	04.10.13 - 13.12.13	Ghent University, Belgium
D.Thyagarajan Director of Distance Education	25 th International Council for open and distance education (ICDE)	16.10.13 - 18.10.13	Tianjin Open University, China
S.Ezhil Valavan Associate Professor	Fifth World waterfowl conference on sustainable waterfowl production (International Conference)	06.11.13 - 08.11.13	Vietnam
J.John Kirubaharan, Professor	Development of e-courses with faculty of RVC, London	07.11.13 - 08.11.13	London
D.Chandrasekaran, Professor and Head	Feeding management of layers in tropics (International Seminar)	25.11.13 - 29.11.13	Central Poultry 2000 Ltd., Lilongwe, Malawi
P.Muthusamy, S.Ezhilvelan Assistant Professors	Advances in veterinary science (International Conference)	09.12.13 - 10.12.13	Singapore
D.Balasubramanyam, Professor			
S.Sureshkumar Associate Professor and Head	Fermentation Technology	31.12.13 - 25.03.14	Ohio State University, USA
S.A.Asokan, Dean, MVC M.Thirunavukkarasu Controller of Examinations K.Kumanan, Director of Research S.N.Sivaselvam, V.Balakrishnan, L.Gunaseelan and V.Ramesh Saravana Kumar, Professor and Heads	Capacity building program and the launch meeting	16.01.14 - 30.01.14	LUNAR, Malawi
S.M.K. Karthickeyan Professor	Marker Assisted Selection in Animal Sciences	20.01.14 - 25.03.14	Cornell University, Ithaca, New York, USA



Overseas training on "Stem Cell and Regenerative Medicine" by Dr.Sabiha Hayath Basha and Dr.A.Arunprasad at Virginia –Maryland Regional College of Veterinary Medicine , Blacksburg, USA

**SEMINARS / SYMPOSIA / WORKSHOPS
/ SUMMER SCHOOLS / TRAINING
PROGRAMMES ORGANIZED**

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9. SEMINARS / SYMPOSIA / WORKSHOPS / SUMMER SCHOOLS / TRAINING PROGRAMMES ORGANIZED

During 2013-14, various trainings / Summer Schools / Short-term courses / Workshops / Seminars / National and International Conferences conducted for the benefit of the scientists and students are listed below:

Training

Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of Participants
Embryo transfer technology to field veterinarian	Animal Reproduction, Gynaecology and Obstetrics, MVC, Chennai	01.04.13 - 10.04.13 17.06.13 - 26.06.13	TNLDA	10
TNPSC Coaching Class	VCRI, Tirunelveli	01.04.13 - 15.04.13	TANUVAS	40
Augmenting animal productivity and advanced veterinary care delivery through continuing education to field veterinarians	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	15.04.13 - 19.04.13	TANUVAS	26
		29.04.13 - 03.05.13		27
Advances in the treatment of medical and surgical ailments in animals	Veterinary Clinical Medicine, Ethics and Jurisprudence, VCRI, Namakkal	22.04.13 - 26.04.13	TANUVAS	29
Advances in small animal surgery	Veterinary Surgery and Radiology, VCRI, Namakkal	25.04.13 - 08.05.13	On payment	1
Intra-cytoplasmic sperm injection (National)	Animal Biotechnology, MVC, Chennai	20.05.13 - 01.06.13	TANUVAS	2
		03.06.13 - 15.06.13		2
		17.06.13 - 29.06.13		2
HRD level II programme	Animal Biotechnology, MVC, Chennai	21.05.13 - 17.06.13	TANUVAS	16
HRD level III for individual project work		01.12.13 - 01.02.14		30
Diagnosis of viral diseases of ruminants (3 batches)	Vaccine Research Centre – Viral Vaccines, MMC, Chennai	11.06.13 - 18.06.13	Department of Animal Husbandry and Veterinary Services, Government of Tamil Nadu	30
		19.06.13 - 26.06.13		
		23.07.13 - 30.07.13		
Large animal surgery	Veterinary Surgery and Radiology, VCRI, Namakkal	17.06.13 - 21.06.13	Andhra Pradesh Veterinary Council	4
		24.06.13 - 28.06.13		9
		21.10.13 - 25.10.13		9
Enhancement of fertility in bovines through artificial insemination	Clinics, VCRI, Namakkal	20.06.13	TANUVAS	23
		21.06.13		25
	Kabilarmalai Veterinary Dispensary	05.02.14		54
	Aavin, Salem	14.02.14		62
		28.11.13		50



Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of Participants
Augmenting animal productivity and advanced veterinary care delivery through continuing education to field veterinarians	Livestock Production and Management, MVC, Chennai	23.06.13 - 26.06.13	TANUVAS	22
		27.01.14 - 31.01.14		25
Insilico genome and proteome analysis	Bioinformatics and ARIS Cell, MVC, Chennai	01.07.13 - 05.07.13	DBT, New Delhi	15
Bluetongue vector identification (International)	Vaccine Research Centre – Viral Vaccines, MMC, Chennai	01.07.13 - 05.07.13	The Pirbright Institute, UK, ICAR, and TANUVAS	50
Diseases of the small animal integument systems	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	03.07.13 - 05.07.13	TANUVAS	11
Basics in veterinary ultrasound	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	15.07.13 - 25.07.13	On payment	40
		16.09.13 - 26.09.13		
		21.10.13 - 31.10.13		
		11.11.13 - 22.11.13		
Basics in veterinary ultrasound (5 batches - 10 per batch)	Veterinary Clinical Medicine, Ethics and Jurisprudence, VCRI, Namakkal	15.07.13 - 25.07.13	Department of Animal Husbandry and Veterinary Services, Government of Tamil Nadu	50
		19.08.13 - 30.08.13		
		16.09.13 - 26.09.13		
		21.10.13 - 31.10.13		
		11.11.13 - 22.11.13		
Skin diseases in dogs and their management	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	17.07.13 - 19.07.13	On payment	10
		10.09.13 - 12.09.13		6
		05.11.13 - 07.11.13		10
Small animal ultrasonographic diagnosis	Clinics, MVC, Chennai	17.07.13 - 19.07.13	Indian Immunologicals, Hyderabad	10
		21.10.13 - 23.10.13	Mars International India PVT. Ltd, Chennai	10
		25.11.13 - 27.11.13		10
Current approach to the diagnosis and management of GI diseases in dogs	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	24.07.13 - 26.07.13	On payment	12
		16.09.13 - 18.09.13		10



Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of Participants
Production of farm tech short films and e-extension tools for efficient TOT	Veterinary and Animal Husbandry Extension and Entrepreneurship, MVC, Chennai	29.07.13 - 07.08.13	TANUVAS	50
Small animal clinical practice	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	01.08.13 - 21.08.13	On payment	1
Current approach on small animal soft tissue surgery	Veterinary Surgery and Radiology, MVC, Chennai	12.08.13 - 14.08.13	Mars International, Chennai	17
		19.08.13 - 23.08.13	Govt. of Andhra Pradesh	6
		16.09.13 - 20.09.13		7
<i>In-vitro</i> fertilization and embryo co-culture (National)	Animal Biotechnology, MVC, Chennai	14.08.13 - 03.09.13	TANUVAS	20
		26.02.14 - 18.03.14		19
Bioinformatical approaches for protein sequence analysis and structure	Bioinformatics and ARIS Cell, MVC, Chennai	21.08.13 - 23.08.13	DBT, New Delhi	27
		07.10.13 - 11.10.13		12
Augmentation of fertility through controlled breeding and strategic adoption of advanced reproductive technologies in small ruminants (National)	Animal Reproduction, Gynaecology and Obstetrics, MVC, Chennai	04.09.13 - 24.09.13	ICAR, New Delhi	17
Small animal ultrasonographic diagnosis	Veterinary Clinical Medicine, Ethics and Jurisprudence, VCRI, Namakkal	02.09.13 - 04.09.13	Mars international, Chennai	8
Current approaches to diagnostic and management of ocular diseases in dog	Veterinary Surgery and Radiology, MVC, Chennai	23.09.13 - 25.09.13	Mars International, Chennai	10
Mitigation of farm environment pollution and recycling of wastes for sustainable poultry production	Poultry Science, VCRI, Namakkal.	25.09.13 - 11.10.13	ICAR., New Delhi	13
INSPIRE	Livestock Business Management, MVC, Chennai	04.10.13 - 05.10.13	TANUVAS	70
Triage and intensive care in small animal practice	Veterinary Clinical Medicine, Ethics and Jurisprudence, VCRI, Namakkal	07.10.13 - 09.10.13	Mars international, Chennai	11
Basics in veterinary ultrasound	Clinics, MVC, Chennai	08.10.13 - 10.10.13	Indian Immunologicals, Hyderabad	10
		05.11.13 - 07.11.13		8
Artificial Insemination in Bitches	Animal Reproduction, Gynaecology and Obstetrics, MVC, Chennai	11.11.13 - 20.11.13	Govt. of Meghalaya	1
Principles and protocols of applied anatomy, physiology and clinical biochemistry in farm and pet animal practice	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	20.11.13 - 10.12.13	ICAR, New Delhi	24



Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of Participants
Small animal internal medicine	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	02.12.13 - 27.12.13	On payment	1
Current concepts in canine breeding and infertility management	Animal Reproduction, Gynaecology and Obstetrics, MVC, Chennai	04.12.13 - 06.12.13	Mars international, Chennai	7
Cryopreservation of bovine semen and evaluation of frozen semen for quality assurance	Animal Genetics and Breeding, MVC, Chennai	03.02.14 - 07.02.14	TANUVAS	8
Training of trainers (ToT) on management of animals in emergencies	Veterinary and Animal Husbandry Extension and Entrepreneurship, MVC, Chennai	09.12.13 - 21.12.13	NDMA and WSPA, New Delhi	30
Bioinformatics and its application	Bioinformatics and ARIS Cell, MVC, Chennai	16.12.13 - 20.12.13	DBT, New Delhi	5
Tick identification from dogs	Veterinary Parasitology, MVC, Chennai	16.12.13 - 20.12.13	TANUVAS and ICMR, New Delhi	1
Data Analysis	Animal Husbandry Statistics and Computer Applications, MVC, Chennai	25.12.13 - 30.12.13	TANUVAS and NAARM, Hyderabad	30
Culicoides species identification	Vaccine Research Centre – Viral Vaccines, MMC, Chennai	26.12.13 - 28.12.13	TANUVAS	2
Newer Techniques/ methods for augmenting production in ruminant animals	Livestock Production and Management, VCRI, Namakkal	20.01.14 - 24.01.14 03.02.14 - 07.02.14	TANUVAS	20 19
Latest techniques in value added poultry products preparation and marketing	Poultry Science, VCRI, Namakkal.	22.01.14 - 11.02.14	ICAR., New Delhi	15
Updates in veterinary emergency and critical care medicine in farm and pet animal practice	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	04.02.14 - 24.02.14	ICAR, New Delhi	18
Bovine Infertility	Animal Reproduction, Gynaecology and Obstetrics, MVC, Chennai	10.02.14 - 14.02.14 24.02.14 - 28.02.14	TANUVAS	21 19
Personality development programme - communication skill	Livestock Business Management, MVC, Chennai	16.02.14	TANUVAS	50
Personality development programme - Attitude and goal setting	Livestock Business Management, MVC, Chennai	23.02.14	TANUVAS	59

Workshops

Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of participants
Small animal cutaneous reconstructive surgery (International)	Veterinary Surgery and Radiology, MVC, Chennai	10.04.13 - 11.04.13	TANUVAS	14
Small animal ophthalmic surgery (International)	Veterinary Surgery and Radiology, MVC, Chennai	10.04.13 - 11.04.13	TANUVAS	8
Avian diseases	Veterinary Pathology, VC&RI, Namakkal	05.08.13 - 07.08.13	TANUVAS	51
Certificate course in laboratory animal science	Veterinary Pathology, MVC, Chennai	14.09.13 - 23.09.13	TANUVAS, CPCSEA, NIAW and LASA, India	25



Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of participants
Sustainable food systems for food security and nutrition (National)	College of Food and Dairy Technology, Koduvalli, Chennai-52.	23.10.13	TANUVAS	250
Information retrieval system (5 batches)	Bioinformatics and ARIS Cell, MVC, Chennai	18.11.13 - 22.11.13	DBT, New Delhi	90
Health monitoring of laboratory animals	Translational Research Platform for Veterinary Biologicals, MMC, Chennai	30.11.13	DBT, New Delhi	120
Horizon of Bioinformatics in animal and veterinary sciences	Bioinformatics and ARIS Cell, MVC, Chennai	09.12.13 - 13.12.13	DBT, New Delhi	1
Application of Bioinformatics in drug designing and pharmacovigilance (National)	Bioinformatics and ARIS Cell, MVC, Chennai	12.02.14 - 14.02.14	DBT, New Delhi	16
Systematic approach to training	Veterinary Clinical Medicine, Ethics and Jurisprudence, MVC, Chennai	25.02.14 - 01.03.14	ICAR, New Delhi	18
Commercial goat farming: managerial skills and business prospects	Livestock Business Management, MVC, Chennai	19.03.14	On payment	41

Summer / Winter School

Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of participants
Recent advances in Bioinformatics for quality livestock production (Summer)	Bioinformatics and ARIS Cell, MVC, Chennai	02.05.13 - 22.05.13	ICAR, New Delhi	25

Conferences / Seminars / Symposia

Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of participants
Participatory rural appraisal and students-farmers' interaction programme	Livestock Business Management, MVC, Chennai	04.03.14	TANUVAS	100
Socio psychological dimensions in client dealing and emerging roles of veterinarians in current scenario	Veterinary and Animal Husbandry Extension and Entrepreneurship, MVC, Chennai	15.04.13	TANUVAS	130
Concepts of ruminal feeding and nutritional remedies at farmers door step	Animal Nutrition, MVC, Chennai	29.06.13 - 30.06.13	TANUVAS and Department of Animal Husbandry and Veterinary Services, Govt. of Tamil Nadu	70
Emerging and Transboundary diseases of global importance (International)	Animal Biotechnology, Madras Veterinary College, Chennai	15.07.13 - 16.07.13	University of Nottingham, England and Virginia Polytechnic Institute and State University, USA and TANUVAS	189
Current trends in tick control research (International)	Veterinary Parasitology, MVC, Chennai	29.07.13	TANUVAS	70



Title of the Programme	Name of the Department / Institute	Duration	Sponsoring Agency	No. of participants
Veterinary Emergency Response during Disaster (National)	Veterinary Animal Husbandry Extension and Entrepreneurship, MVC, Chennai	12.08.13	National Disaster Management Authority, New Delhi and World Society for the Protection of Animals, New Delhi	121
Opportunities and protocol for export of livestock / poultry products	Livestock Business Management, MVC, Chennai	19.08.13	TANUVAS	300
Vector Day	Veterinary Parasitology, MVC, Chennai	23.08.13	TANUVAS	75
Current nutritional concepts for productivity enhancement in livestock and poultry	Central Feed Technology Unit, Kattupakkam	29.08.13 - 30.08.13	TANUVAS	180
Pharmaceutical meet	Veterinary Pharmacology and Toxicology, VCRI, Namakkal	24.10.13	TANUVAS	85
Exploring the learning resources to develop continuing professional development programmes for the veterinarians	Veterinary Microbiology, MVC, Chennai	22.01.14 - 24.01.14	The British Council of India	50
Pharmaceutical meet	Veterinary Pharmacology and Toxicology, MVC, Chennai	22.11.13	TANUVAS	107



National Conference on "Current nutritional concepts for productivity enhancement in livestock and poultry"



International Workshop on "Avian Diseases"



Certificate course in Laboratory Animal Medicine



Workshop on Health monitoring of laboratory animals

EXTENSION EDUCATION ACTIVITIES





10. EXTENSION EDUCATION ACTIVITIES

Extension Education

In collaboration with line departments like the Dept. of Animal Husbandry, Government of Tamil Nadu, Tamil Nadu Co-operative Milk Producers Federation Ltd., Tamil Nadu Livestock Development Agency and other Government organizations, TANUVAS conducts regular training programmes and refresher courses. For effective dissemination of information among the rural people, training programmes, exhibitions, media coverage, All India Radio and Television programmes



are being organized and pamphlets and bulletins are also published at regular intervals. All these extension activities are monitored by the Directorate of Extension Education. During the reporting period, 7,66,495 farmers got benefited and veterinary health care services were provided to 1,23,947 livestock and poultry.

Audio / Video lessons

Totally, 38 video lessons and 3 audio lessons have been prepared so far and distributed to the VUTRCs /



FTCs / KVKs and Research Stations, information centres, NGOs, line departments and to the farming community to serve as teaching tool for farmers and end users. During the report period, 1082 video lessons were screened and 116454 farmers benefited. The audio / video lessons are also being sold through the VUTRCs / FTCs / KVKs and Agricultural Technology Information Centre of the University.

Continuing Education programmes

Continuing Education programmes are being conducted for the University faculties, Officers of Animal Husbandry Department, Tamil Nadu Co-operative Milk Producers Federation Ltd., Tamil Nadu Livestock Development Agency and National Dairy Development Board. During this year a total of 822 staff were trained through 15 programmes.



Training Programmes

VUTRCs, FTCs and KVKs are involved in imparting training programmes based on the needs of the farmers.





The training on various aspects viz. dairy farming, sheep and goat farming, pig farming, rabbit farming, poultry farming, agro-forestry, fodder development, mixed farming, profitable livestock farming, backyard poultry farming, vermi compost preparation, azolla cultivation for livestock feeding, preparation of value added milk and meat products, etc., were offered to the farmers and entrepreneurs. During the period under report, 871 on-campus training programmes and 2543 off-campus training programmes were conducted for the benefit of 26300 and 146759 farmers respectively.

Sponsored Training Programmes

- With the coordination of Department of Animal Husbandry, Government of Tamil Nadu, training programmes were organized through the University Peripheral Centres for the beneficiaries of Tamil Nadu Government schemes on “Free distribution of Milch Cows to the poor families in rural areas”, “Free distribution of Goat/Sheep to the poor families in rural areas” and the poultry development. During the period from January 2013 to December 2013, a total of 113 programmes benefitting 5332 dairy farmers, 11933 programmes benefitting 130423 goat farmers and 95 programmes benefitting 5724 sheep farmers were conducted.



- A total of 89 training programmes were organized for the 1206 beneficiaries of the scheme on “National Mission for Protein Supplement”.
- Eight training programmes were organized for the 595 beneficiaries of Tamil Nadu Government scheme on “Fodder development” through the University Peripheral Centres.

Advices and Consultancy

The total number of advices and consultancy services rendered in person, by post, telephone, e-mail, touch screen and by way of field visits during the year were 61,046.

Mass Media Coverage

A total of 300 radio programmes, 41 television programmes were presented during the year 2013-14.

Exhibition cum Mass Contact Programmes

During 2013-14, 370 exhibitions cum mass contact programmes were conducted benefitting 3,09,852 farmers and 1,23,947 animals.



Regional Livestock and Fisheries Exhibition

To educate livestock and fish farmers about various technologies and recent advances in livestock and fisheries sectors, TANUVAS organized the fourth “Regional Livestock and Fisheries Exhibition” at Thiru Kamarajar Boys Higher Secondary School, Villupuram from 20.04.2013 to 22.04.2013. Thiru T.K.M.Chinnayya, Hon’ble Minister for Animal Husbandry, Government of Tamil Nadu inaugurated the exhibition and delivered inaugural address. Thiru P. Mohan, Hon’ble Minister for Rural Industries, Government of Tamil Nadu presided and delivered the special address. More than 15000 farmers and students visited the exhibition.



Kisan Call Centre

The Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India has launched Kisan Call Centre, Level II which is functioning at the Directorate of Extension Education with a toll free telephone number 1551.

Touch Screen Information Kiosk

Totally 27 Touch Screen Information Kiosks were located at the following places viz., Madras Veterinary College campus; Agricultural Technology Information Centre, Kattupakkam; Veterinary College and Research Institute, Namakkal; VUTRCs – Coimbatore, Cuddalore, Dindigul, Dharmapuri, Erode, Karur, Melmaruvathur, Madurai, Nagercoil, Rajapalayam, Salem, Thanjavur, Tiruchirapalli, Tiruppur, Vellore and Villupuram; Farmers Training Centre – Kancheepuram, Tiruvarur and Theni; Poultry Research Station, Chennai; Regional Research Centre, Pudukkottai; KVK, Kundrakudi; Farmers Hostel, MMC, Chennai and also at TANUVAS Headquarters. Softwares on Dairy farming, Goat farming, Poultry farming, Japanese quail farming, marketing avenues and Right to Information Act-2005 have been installed in the Touch Screen Information Kiosks.

Agricultural Technology Information Centre, Kattupakkam

Agricultural Technology Information Centre at Kattupakkam provides services, product information through single window delivery system under the financial support of National Agricultural Technology Project of ICAR.

During the period under report, a total of 7861 University publications, 40 ICAR publications and 1453 video lessons were sold benefiting 9354 farmers / entrepreneurs. Technical advisory services were rendered in-person for 1981; through post for 41 and through telephone for 258 farmers.

Pongal Vizha - 2014

TANUVAS celebrated Pongal Vizha-2014 as “Kalnadai Matrum Meenvala Vara Vizha” during January – February 2014 through its constituent colleges and extension outlets to showcase the activities and importance of livestock, poultry and fisheries sector in promoting the rural economy. During this celebration, a total of 68 programmes viz., trainings, seminars, exhibitions, farmers meet and livestock health camps were conducted benefiting 8438 farmers and 4774 animals were treated for various ailments.





Distance Education Programme

With an aim to provide learning opportunity to farmers, farm women, school drop outs, TANUVAS offers various courses in Animal Husbandry and Veterinary Science through print and online modes through the Directorate of Distance Education. The various courses with students enrolled during 2013-14 are listed below:

Certificate Courses

Sl. No.	Course title	Medium of instruction	Duration of the course	Mode of delivery	No of candidates enrolled
1	Dairy Farming	Tamil	3 Months	Print mode	30
2	Goat Farming	Tamil	3 Months	Print mode	48
3	Sheep Farming	Tamil	3 Months	Print mode	-
4	Piggery Farming	Tamil	3 Months	Print mode	2
5	Rabbit Farming	Tamil	3 Months	Print mode	1
6	Broiler Farming	Tamil	3 Months	Print mode	7
7	Layer Farming	Tamil	3 Months	Print mode	3
8	Japanese Quail Farming	Tamil	3 Months	Print mode	4
9	Turkey Farming	Tamil	3 Months	Print mode	9
10	Desi- Bird Farming	Tamil	3 Months	Print mode	53
11	Livestock Fodder Production	Tamil	3 Months	Print mode	11
12	Concentrate Feed Preparation	Tamil	3 Months	Print mode	1
13	Hatchery Management	Tamil	3 Months	Print mode	1
14	Value Added Milk Product Preparation	Tamil	3 Months	Print mode	1
15	Value Added Meat Product Preparation	Tamil	3 Months	Print mode	-
16	Waste Disposal Management	Tamil	3 Months	Print mode	1
17	Bio-Security Measures	Tamil	3 Months	Print mode	1
18	Clean Meat Production	Tamil	3 Months	Print mode	-
19	Feed Milk Management	Tamil	3 Months	Print mode	8
20	Animal Welfare	English	6 Months	Print and Online mode	25
21	Optimizing Cattle Feeding Based on Locally Available Fodder Resources	English	6 Months	CD – ROM based	3
22	Livestock and Poultry Farm Manager	Tamil	6 Months	Print mode	13
	Total				222

**Skill Development Programmes**

Sl. No.	Courses offered	No. of candidates enrolled
1	Dairy Farm Assistant	46
2	Dairy Plant Assistant	3
3	Milk and Milk Products Quality Control Assistant	6
4	Feed Mill Supervisor	17
5	Feed Analytical Technical Assistant	1
6	Livestock Farm Manager	13
7	Poultry Farm Manager	1
8	Hatchery Supervisor	1
9	Poultry Farm Supervisor	8
10	Poultry Breeder Farm Supervisor	-
11	Turkey farming Assistant	-
12	Poultry Vaccinator	12
13	Laboratory Assistant	11
14	Surgery Theatre and Radiology Attendant	2
15	Small Animal Attendant	1
	Total	122

Self-Employment Programmes

Sl. No.	Courses offered	No. of candidates enrolled
1	Dairy farming	47
2	Sheep Farming	12
3	Goat Farming	143
4	Fodder and Fodder Seed Production	7
5	Preparation of Fermented Dairy Products	3
6	Livestock Farm Waste Utilization	5
7	Rabbit farming	6
8	Pig farming	7
9	Japanese Quail Farming	7
10	Desi-chicken Rearing	84
11	Fresh Water Fish Farming	6
	Total	327

University Publication Division

Publication Division of TANUVAS is engaged in publishing the following scientific and popular publications.

- ◆ "Indian Journal of Veterinary and Animal Sciences Research", a bi-monthly scientific journal. The life membership fee is ₹3000/- and annual subscription is ₹500/-.
- ◆ A bi-monthly "TANUVAS Technical Reporter" in English
- ◆ "Kalnadai Kathir", a popular bi-monthly Tamil Journal. The Life membership fee is ₹1000/- and annual subscription is ₹100/-
- ◆ A monthly "News letter" in English and "செய்தி மடல்" in Tamil



RESEARCH STATIONS AND SERVICE UNITS



11. RESEARCH STATIONS AND SERVICE UNITS

Farms

TANUVAS has the following Research stations, Instructional farms and Feed technology unit:

1. Post Graduate Research Institute in Animal Sciences, Kattupakkam
2. Mecheri Sheep Research Station, Pottaneri
3. Sheep Breeding Research Station, Sandynallah, Ooty
4. TANUVAS Regional Research Centre, Pudukottai
5. Poultry Research Station, Madhavaram Milk Colony, Chennai
6. University Research Farm, Madhavaram Milk Colony, Chennai
7. Instructional Livestock Farm, Namakkal
8. Instructional Livestock Farm, Tirunelveli
9. Instructional Livestock Farm, Orathanadu, Thanjavur
10. Central Feed Technology Unit, Kattupakkam

Post Graduate Research Institute in Animal Sciences, Kattupakkam

The stock position of the different units and revenue generated as on 31.03.2014.

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Livestock		
	Cattle and Buffalo		
	Crossbred cattle (Jersey x Sindhi)	111	30.30
	Kangayam cattle (work cattle)	4	
	Murrah buffaloes	60	
	Sheep		
	Madras Red	387	4.20
	Goat		
	Non-descript	27	
	Kanni goat	23	
	Boer X Non-descript	77	
	Pigs		
	Large White Yorkshire	138	44.11
	Landrace	36	
	Duroc	16	
	F ₁ (Large White Yorkshire x Landrace)	32	
	F ₁ (Duroc x Large White Yorkshire)	31	
	Three-way synthetic	69	
	75% crossbred pigs	112	
2.	Ostrich	94	11.57
3.	Rabbit		
	New Zealand White	228	0.44
	Soviet Chinchilla	17	
4.	Farm produces	-	1.17
Total			91.79



Three way synthetic Pigs and 75% crossbred (LWY x Desi) at PGRIAS, Kattupakkam



Mecheri Sheep Research Station, Pottaneri

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Sheep Mecheri sheep	803	6.63
2.	Goat Salem Black	918	
3.	Farm produces		1.50
Total			8.13

Sheep Breeding Research Station, Sandynallah, Ooty

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Sheep		9.82
	Nilagiri	512	
	Sandyno	635	
	Dorset cross	166	
	Garole	7	
	Garole X Sandyno	78	
2.	Rabbit		0.46
	New Zealand White	30	
	Soviet Chinchilla	72	
3.	Geese	132	0.28
4.	Farm produces		8.74
Total			19.30



Sandyno sheep, rabbits and geese at SBRS, Sandynallah

TANUVAS Regional Research Centre, Pudukottai

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Turkey	575	2.22
2.	Emu	49	0.89
Total			3.11



Emu Unit at RRC, Pudukottai

**Poultry Research Station, Madhavaram Milk Colony, Chennai**

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Japanese quails	6486	38.08
2.	Turkey	893	
3.	Broiler	1761	
4.	RIR	56	
5.	Nandanam Chicken IV	1496	
6.	Aseel	685	
7.	Fancy	349	
8.	Guinea fowl	364	
9.	WLH	53	
10.	Geese	15	
Total			38.08



Guinea fowl and Turkey at Poultry Research Station, Madhavaram, Chennai

University Research Farm, Madhavaram Milk Colony, Chennai

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Livestock		7.05
	Cattle		
	Bargur	2	
	Deoni	6	
	Gir	8	
	Kangayam	3	
	Rathi	4	
	Sahiwal	8	
	Tharparkar	2	
	Crossbred	15	
	Buffalo	5	
	Sheep		
	Madras Red	7	
	Mecheri	3	
	Trichy Black	4	
	Coimbatore	3	
	Nilgiri	2	
	Sandyno	3	
	Ramnad White	4	
	Vembur	1	
	Kilakarsal	4	
	Katchakatti	3	
	Chevaadu	3	
	Dorset X Nilgiri	3	
	Goat		
	Barbari	3	
	Tellicherry	30	
	Kanni Goat	1	
	Jamunapari	2	
	Sirohi	3	
	Beetal	2	
	Osmanabadi	2	
	Zhakrana	3	



	Boer	2	
	Country Goat	75	
2.	Pigs		1.32
	Large White Yorkshire	181	
	Landrace	33	
3.	Poultry		0.20
	Rhode Island Red	4	
	Kadakanath	12	
	Aseel	7	
	Frizzle	2	
	Cochin bantham	5	
	White leghorn	8	
	Rhodo white	8	
	Nandanam Broiler - 2	9	
	Nandanam Broiler - 3	10	
	Nicobari black	11	
4.	Rabbit		0.30
	New Zealand White	37	
	Soviet Chinchilla	39	
	White Giant	39	
5.	Farm produces		29.50
	Total		38.37



Fodder unit at University Research Farm, Chennai

Instructional Livestock Farm, Tirunelveli

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Sheep		2.48
	Vembur	127	
	Kilakarsal	118	
	Ramnad white	3	
	Chevadu	3	
	Kanni Adu	3	
	Kodi Adu	4	
	Goat		
	Jamunapari	26	
2.	Fodder		3.13
	Total		5.61

Instructional Livestock Farm, Orathanadu, Thanjavur

Sl. No.	Name of the Unit	Stock as on 31.03.2014	Revenue Generated (₹ in lakhs)
1.	Sheep		0.59
	Pattanam	54	
	Mecheri	9	
	Goat		0.59
	Non-descript	82	
2.	Pig		
	Large White Yarkshire	40	4.12
3.	Chicken	41	0.12
4.	Fodder		0.47
	Total		5.30



Central Feed Technology Unit, Kattupakkam

During the reporting period, 2226659kg of Livestock and Poultry feeds were supplied on need basis to the farmers. A total of 134433kg TANUVAS Mineral Mixture and Area Specific Mineral Mixtures were also supplied to the farmers and entrepreneurs. The revenue earned by this unit is ₹ 582.94 lakhs.

TRAINING AND RESEARCH CENTRES

The services rendered by the Veterinary University Training and Research Centres (VUTRCs), Farmers Training Centres (FTCs), TANUVAS Regional Research Centre, Instructional Livestock Farms and Krishi Vigyan Kendras (KVKs) during this period are given below:

Location of the Centres	On and Off campus Trainings		Clinical activities				Technical Advices given	Mass Contact Programmes
	Training	Persons benefited	Specimens analysed	Outbreaks attended	Infertility cases treated	Deworming / Vaccinations carried out		
Veterinary University Training and Research Centres								
Coimbatore	174	11599	65	-	-	916	3284	1
Dharmapuri	154	9244	400	3	-	7658	817	18
Dindigul	111	6476	34	6	-	3628	1407	15
Erode	160	11823	499	34	105	985	4265	1
Karur	114	5929	447	4	234	11446	2240	25
Madurai	142	7025	602	19	470	8485	5514	29
Melmaruvathur	141	5250	717	5	122	7117	647	24
Cuddalore	94	4602	144	-	48	521	370	5
Rajapalayam	94	4807	-	11	-	847	2699	1
Salem	113	7917	295	3	355	4794	1552	7
Tiruchirapalli	81	6338	22	-	-	4000	1497	9
Thanjavur	107	5861	257	1	-	23	205113	9
Tirupur	168	11171	736	-	-	2766	1552	11
Vellore	230	12514	95	2	80	1312	154	2
Nagercoil	69	5249	-	-	-	278	1053	1
Villupuram	65	3326	154	28	673	2950	1771	15
Tiruvannamalai	278	17178	32	12	1100	4684	1400	16
Krishnagiri	212	13588	-	10	-	1797	757	15
Regional Research Centre, Pudukottai	68	2690	163	1	-	3412	895	-
Krishi Vigyan Kendras								
Kattupakkam	128	5042	-	-	-	-	2765	-
Kundrakudi	141	6609	-	-	-	1207	2292	14
Namakkal	161	10284	-	-	-	1713	3697	-



Farmers' Training Centres								
Tiruvarur	44	1336	1	12	64	-	3637	1
Kancheepuram	48	2209	-	-	-	-	950	-
Theni	118	5890	-	-	-	-	2575	8
Total	3215	183957	4663	151	3251	70539	252903	227

SERVICE UNITS

The activities of the service units such as Library, Computer Centre, Bioinformatics Centre, Clinical Services and laboratory services in the improvement of this University during the reporting period are given below:

Library

The University has library facilities in all its constituent colleges with large collection of books and journals. In addition, they possess CD-ROM databases.

Services offered by the Libraries of TANUVAS

- ✎ Lending of books and documents to students and faculty members
- ✎ Journal reference service

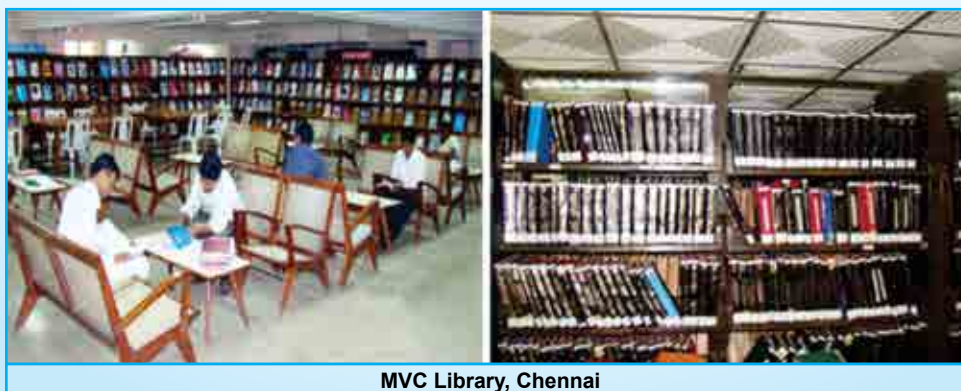
- ✎ Access to online journals and e-books
- ✎ Information retrieval through CD-ROM Databases
- ✎ Reprography / Printing / CD writing
- ✎ Microfilming
- ✎ Resource sharing through Madras Libraries Network-MALIBNET and British Council Library
- ✎ Binding of books and documents
- ✎ SC/ST Book Bank facility
- ✎ Student Counseling and Placement cell

Facilities available at TANUVAS Libraries

- ✎ Online public access catalogue
- ✎ Digitization of theses
- ✎ Electronic surveillance system
- ✎ Archives unit

Stock position as on 31.3.2014 at TANUVAS libraries

Particulars	MVC, Chennai	VC&RI, Namakkal	VC&RI, Orathanadu	VC&RI, Tirunelveli	CFDT, Koduvalli
Stock of books	43,147	10,241	972	16,255	2,414
Periodicals and monthly journal	145	61	15	44	13
e-Books	250	-	-	-	-
Journals with online access	80	19	-	-	-
Access to Online Journals through CeRA	2,900	-	-	1,700	-
Student and Staff beneficiaries	39,740	14,653	136	42,500	160
Non-member beneficiaries	3,326	1,123	28	-	-
Total back volumes	25,100	3,300	15	-	-
Video lessons	196	48	67	65	-



MVC Library, Chennai



Computer Centre

Activities of the Students Computer Centre, Internet Kiosk and Server station attached to the Department of Animal Husbandry Statistics and Computer Applications of Madras Veterinary College are furnished below:



- Hands on training on computer applications to both UG and PG students.
- Computer network management and provision of Internet and Intranet services; Facilitating communication through LAN and WAN within different colleges and University and across the colleges and University Headquarters.
- Scanning, Network Printing, Electronic multicopying and Digital Photography facilities offered by this department are utilized by various departments.
- Periodic updation of TANUVAS website, www.tanuv.ac.in, for the benefit of students and stakeholders.
- One GB net working connectivity was established during this year.

The Student Computer Centre provides a comprehensive environment for computing, browsing, e-mailing and networking, so as to improve the learning activity among students, and enhance teaching effectiveness and research capability among faculty members. The major objectives of TANUVAS computer network are to establish and maintain a campus-wide network, to provide the faculty, students, and staff easy access to computers. The Computer Centre has 38 systems for the students and trainees to use and Internet Kiosk has 20 systems to enable browsing by students and trainees.

The e-Learning Laboratory caters to the needs of content developers of the courses offered for the BVSc & AH Degree Programme under the NAIP Scheme on "Development of e-Courses for B.V.Sc. & A.H. Degree Programme" for developing e-contents.

TANUVAS Website (www.tanuv.ac.in)

TANUVAS website was created with a view to incorporate all the activities of the university under one portal. It has several windows like history of TANUVAS, structure and governance, constituent units, academic programmes, research resources and services. Under research category, ongoing schemes and salient research findings of the completed schemes are displayed. The website contents are updated periodically by a website updation committee headed by the Director of Research.

Bioinformatics Centre

The Biotechnology Information System (BTIS) of TANUVAS was started during 1990-91 at Madras Veterinary College, Chennai, under the aegis of Department of Biotechnology, Government of India, New Delhi. This Centre is equipped with the following facilities:

- CD ROM Data bases
- Broad band (128 Kbps) Internet connectivity from VSNL.
- 10 computers for online and offline information retrieval, to facilitate training programmes and for the conduct of practical and project works of students of PG diploma in Bioinformatics.
- A Wetlab facility with Gel Electrophoresis, Digital Electronic Balance, Thermal Cycler and UV-Transilluminator for PG research
- Agricultural Research Information System Cell for internet browsing and online information retrieval

During the reporting period, 267 scientists and research scholars of TANUVAS have utilized the online and offline facilities of this centre. Four students from outside colleges completed their projects. The revenue earned through the students research work was ₹ 50,000/-

Clinical services

TANUVAS offered clinical services through Veterinary Teaching Hospital, Emergency Critical Care Unit and Centralised Clinical Laboratory at Madras Veterinary College, Peripheral Veterinary Hospital at Madhavaram, Veterinary Teaching Hospitals at Veterinary College and Research Institute, Namakkal; VC&RI, Orathanadu and VC&RI, Tirunelveli. A total of 1,36,626 cases were treated during 2013-14. A revenue of ₹ 83,28,345/- was generated through hospital collection and ₹ 32,90,000/- was generated through the conduct of training programmes for the year 2013-14.



Veterinary Teaching Hospital

Clinical ward training is being imparted to the UG and PG students at Madras Veterinary College Teaching Hospital. Practising veterinarians were given clinical training at the hospital to update their knowledge in the latest techniques in the diagnosis and treatment of various ailments in small and large animals.



During the reporting period, 6 students from Virginia Maryland Regional College of Veterinary Medicine; 6 students from Malaysia, University Putra Malaysia, Malaysia and 49 students from Chittagong Veterinary & Animal Sciences University, Bangladesh were given hands on clinical training at MVC, Teaching Hospital.

To encourage and motivate UG students, a Clinical Club has been established and Clinical meetings for UG students were regularly conducted. Internees of Veterinary College and Research Institute, Namakkal were given clinical internship training at Madras Veterinary College Hospital and also at Veterinary University Peripheral Hospital, Madhavaram for 3 months.

Hospital Services

The following are the species-wise clinical cases attended during the year 2013-14 :

Description	MVC		VUPH	Clinics VC&RI Namakkal	TVCC, VC&RI Orathanadu	TVCC, VC&RI, Tirunelveli	TOTAL
	Clinics	RVSS	Madhavaram				
Bovines	9,916	530	1,733	7,862	8,869	778	29,688
Canine	51,385	5,754	13,201	11,351	800	3,884	86,375
Feline	3,075	385	428	351	-	181	4,420
Equine	1,653	54	11	389	1	64	2,172
Caprine/Ovine	3,698	809	1,120	3,426	3,780	1,265	14,098
Avian	668	28	1,134	95	1,982	373	4,280
Others	581	53	144	229	24	64	1,095
Total	70,976	7,613	17,771	23,703	15,456	6609	1,42,128

In-patient Facilities

- ◆ At MVC teaching hospital, 210 large and 116 small animals were admitted and treated as in-patients for various ailments.
- ◆ At VC&RI, Namakkal, 632 large animals and 102 small animals were admitted and treated as in-patients.
- ◆ At VC&RI, Orathanadu, 375 large animals and 51 small animals were admitted and treated as in-patients.
- ◆ At VC&RI, Tirunelveli, 129. large animals and 816 small animals were admitted and treated as in-patients.
- ◆ A separate quarantine unit to house animals suspected for rabies is functioning in all the institutions.

Details of prophylactic vaccinations carried out

Name of the vaccine	Clinics, MVC, Chennai	Clinics, VC&RI, Namakkal	VUPH Madhavaram Milk Colony	TVCC, VC&RI Orathanadu	TVCC, VC&RI, Tirunelveli	Total
Anti-Rabies vaccine for dogs	5506	921	1523	154	1993	10097
Distemper, Hepatitis, Parvo & Leptospirosis vaccines for dogs	11109	2007	2058	-	1889	17063
Ranikhet disease vaccine for poultry	2851	-	-	1764	-	4615
Total	19466	2928	3581	1918	3882	31775



Pharmacy

The Pharmacies attached to the teaching hospitals, dispense drugs to different units based on prescriptions for treatment of sick animals free of cost. A sum of ₹ 14 lakhs was utilized towards the purchase of drugs for MVC teaching hospital, ₹ 6 lakhs for VC&RI Hospital, Namakkal and ₹ 2.5 lakhs for Veterinary University Peripheral Hospital, Madhavaram. Dr. Srinivasan Memorial Fund was also utilized to purchase specific medicines which are not available in the hospital pharmacy to treat complicated cases.

Referral Units

The following state of the art facilities are available at TANUVAS Hospitals:

Madras Veterinary College, Chennai

- ✧ Ultra sound scanner
- ✧ Doppler
- ✧ Slit lamp Biomicroscope
- ✧ ECG & EEG
- ✧ Holter monitoring system
- ✧ Vital Sign Monitor
- ✧ Pulse oximeter
- ✧ Laparoscopy
- ✧ Haemodialyser
- ✧ Radiant warmer
- ✧ Digital phonocardiograph
- ✧ C-Arm Fluroscopy
- ✧ Doppler Blood Pressure apparatus
- ✧ Endoscopic image documenting system
- ✧ Operating ophthalmic microscope
- ✧ Phaco for cataract surgery
- ✧ Dental scalar
- ✧ Arthroscopy

Veterinary College and Research Institute, Namakkal

- ✧ Ultra sound scanner
- ✧ ECG
- ✧ Endoscopy
- ✧ Operating ophthalmic microscope
- ✧ Dental scalar
- ✧ Vital Sign Monitor
- ✧ Large and small animal gas anaesthetic machine
- ✧ Ventilator
- ✧ Echo colour doppler

Veterinary College and Research Institute, Orathanadu

- ✧ Colour Doppler ultrasonogram
- ✧ X-ray unit

Veterinary College and Research Institute, Tirunelveli

- ✧ Doppler Ultrasonograph
- ✧ Electrocardiogram
- ✧ OT Hydraulic Table
- ✧ Vital Sign Monitor
- ✧ Autoclave
- ✧ Infusion Pump



Doppler Ultrasonograph



Infusion pump

Cases attended at the referral clinics

Particulars	MVC Chennai	VUPH, Madhavaram	VC & RI Namakkal
Ultrasonography	2770	34	608
Endoscopy	36	0	110
ECG	834	41	223
Radiology	8112	42	6102
Laparoscopy	882	0	342
Vaginal Cytology	370	0	173
Echo Doppler	13004	117	7558
Arthroscopy	2770	34	608

Theatre Services

- * 556 major, 391 minor soft tissue, 138 Orthopaedic, 141 Ophthalmic and 540 Obstetrical surgeries were done at MVC Teaching Hospital.
- * 382 major, 108 minor, 14 orthopaedic and 12 ophthalmic surgeries were done at VC&RI Teaching Hospital, Namakkal.
- * 51 major, 1203 minor, 641 orthopaedic and 5 ophthalmic surgeries were done at VC&RI Teaching Hospital, Orathanadu.
- * 95 major, 604 minor and 25 orthopaedic surgeries were done at VC&RI Teaching Hospital, Tirunelveli



* 73 major and 20 minor surgeries were done at VUPH, Madhavaram.

Emergency and Critical care unit of Resident Veterinary Service Section, MVC, Chennai (Round the clock service)

During the period under report, the details of emergency cases treated are furnished hereunder:

Species	No. of cases
Bovine	1,116
Canine	6,733
Feline	441
Equine	96
Caprine & Ovine	1,385
Others	92
Total	9,863

Revenue Generated

	Revenue generated (₹ in Lakhs)						TOTAL
	MVC		VUPH Madhavaram Milk Colony	Clinics VC&RI Namakkal	TVCC, VC&RI, Orathanadu	TVCC, VC&RI, Tirunelveli	
	Clinics	RVSS					
Hospital	56.90	3.60	11.32	11.45	0.10	-	83.37
Training	32.90	-	-	-	-	-	32.90
Total	89.80	3.60	11.32	11.45	0.10	-	116.27

Laboratory Services

This University has the following research service laboratories to serve the livestock and poultry sectors.

Centralised Clinical Laboratory (CCL), MVC, Chennai

The number of samples screened in CCL is furnished below:

Particulars	No. of samples
Hematology	10184
Urinalysis	547
Biochemistry	6967
Coprology	558
Dermatology	44
Clinical microbiology	1260
Antibiotic Sensitivity Test	1268
Cytology	1543
Total	22371

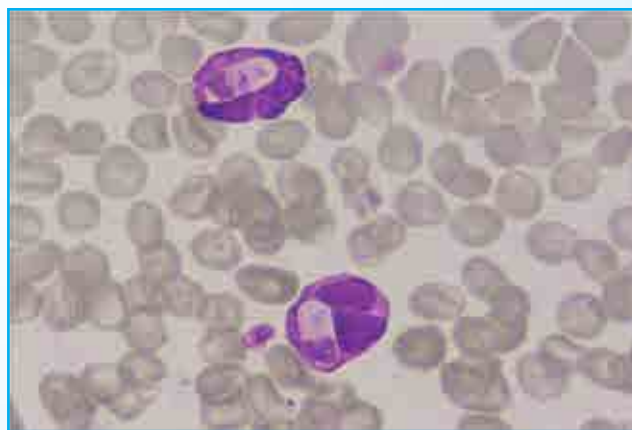
Haematological examination of companion animals revealed that 43% of positive cases were infected with *E.canis*, followed by *B.gibsoni* 25%, *H.canis* 18%, *B.canis* 8.4% and 27% of animals showed anemic changes. The incidence of haemoprotozoans was less when compared to previous year. In case of farm animals, 34% of positive cases were infected with *Theileria* sp and 59% were with *Anaplasma* sp. which is correlating with 16% of FA showing anemic changes. Platelet count is routinely done to assess the bleeding disorder.

Mobile Veterinary and Ambulance Services

A total of 15,453 livestock / pets were treated by the Mobile Veterinary Services available at all the Hospitals of TANUVAS.

Veterinary Medical Record Section

Computer registration of cases was introduced at Madras Veterinary College Teaching Hospital, Chennai in January 1998. The case sheets and clinical slips were formatted to computerize the clinical data adopting international code.

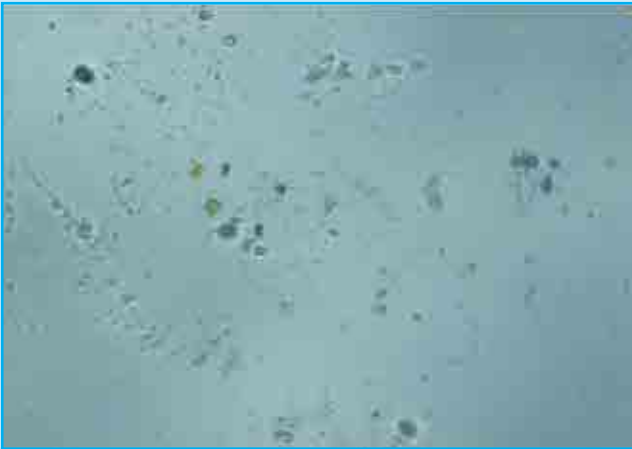


H. Canis in dog

A total of 558 dung samples were screened for parasitic ova. *Ancylostoma* sp. ova (7), *Toxocara* (6), *Strongyloides* sp. (9) and *Isospora* sp. (3) were predominant in companion animals, while in farm animals *Strongyles* sp. (23), Amphistomes (13), *Eimeria* oocysts (35), *Parascaris equorum* (1) and *Trichuris* sp. (3) were prevalent.

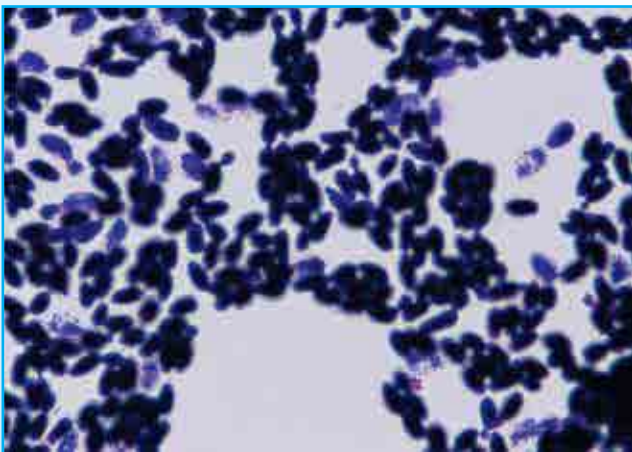
Out of the 547 urine samples, 377 samples showed elevated protein which is correlated with elevated BUN and Creatinine which are indicators of renal problems.

Out of 1260 clinical materials for culture and antibiotic sensitivity test, 901 samples were from companion animals, 358 samples from farm animals



2,8 dihydroxy adenine crystals in dog

and 1 sample was from wild animal. Out of these, 246 samples were subjected for fungus culture. The commonly received materials were skin scrappings, ear swabs, ocular swabs, pus swabs and milk Samples. Staphylococcus sp were frequently isolated microorganisms from canine pyoderma and were sensitive to cefotaxime and relatively resistant to Ciprofloxacin. On survey of fungal dermatitis, *Aspergillus*, *Penicillium* and *Rhizopus* spp was frequently isolated. Among the non dermatophytes, *Aspergillus niger* was frequently isolated followed by *Aspergillus fumigatus*, *Phycomycetes*, *Penicillium sp* and *Curvularia sp*. Along with the molds, Yeast such as *Malassezia pachydermatis* and *Candida albicans* were also isolated.



Candida sps.

A Total of 6967 serum samples were tested for various biochemical parameters. A request for kidney panels viz BUN 5762 and creatinine 5725. 1812 of clinical samples showed elevated BUN values and 1555 showed elevated creatinine. The incidence of renal problem is higher than previous year. Liver function test showed 973 samples have elevated ALT, 1811 have hypoalbuminimia.

Central Instrumentation Laboratory (CIL), MVC, Chennai

During the reporting period, a total of 745 persons including students, research scholars and staff members of this institution as well as from other institutions utilized the laboratory facilities available in this department. A total number of 158 samples were received for various examinations (namely Electron Microscopy, Freeze Drying, Cryostat Microtomy and Fluorescent microscopy, Inverted microscopy etc.). A sum of ₹3,17,000/- has been collected as fee towards project work undertaken in this laboratory and also towards screening of samples for electron microscopy and freeze drying.



Fluorescent Microscope

Central University Laboratory (CUL), MMC, Chennai

This Laboratory coordinates with line departments in monitoring animal health and disease surveillance. This laboratory produces and supplies diagnostic reagents and biologicals to the line departments on need basis. The laboratory involves in investigation of animal diseases and monitoring of animal health in University Farms and provides Anthrax free health certificate to exporters and creates awareness and provides expert



guidance to control livestock and poultry disease problems to the farmers. CUL provides need based short term training on animal disease diagnosis. A total of 10,531 samples received from various parts of Tamil Nadu for various livestock and poultry diseases were screened during the period under report and a sum



of ₹ 56,575/- was generated as revenue. During the reporting period, this laboratory organized a workshop on “Avian Diseases and biosecurity in poultry farms” for 25 Veterinarians and training on “Laboratory diagnostic techniques” for 10 Veterinarians from Department of Animal Husbandry and Veterinary Services, Government of Tamil Nadu.

Zoonoses Research Laboratory, MMC, Chennai

- ❖ A total of 4,090 human and 728 animal serum samples from suspected cases were screened by Microscopic Agglutination Test (MAT) for detection of leptospiral antibodies. Out of 4,090 human samples tested, 1981 (48.43%) were found positive. Out of the 728 animal samples tested, 511 (70.19%) samples were found positive. Australis and Autumnalis were the predominant serogroups found in both the samples.
- ❖ The Revenue earned during 2013-14 was ₹ 16,77,119/-.



Microscopic agglutination test

Bacterial Vaccine Research Centre, Madhavaram Milk Colony, Chennai

- ❖ During the reporting period, field trial with 900 doses of heat inactivated Johne’s disease (JD) vaccine was carried out in sheep, goat and cattle at SBRS, Ooty; MSRS, Mecheri and farms at Orathanadu for control of the disease. The vaccine was found to be safe, effective in reducing clinical cases of Johne’s disease, faecal shedding and mortality due to JD.
- ❖ Mannheimia haemolytica was isolated from Japanese quail and an autogenous vaccine was developed for the control. 2,95,000 doses were prepared and supplied to Japanese Quail breeders.

- ❖ Two hundred doses of Pasteurella vaccine for Snuffles were prepared and supplied to PGRIAS, Kattupakkam.
- ❖ This unit has generated a revenue of ₹ 1,10,625/- through sale of vaccine.

Viral Vaccine Research Centre, Madhavaram Milk Colony, Chennai

- A new scheme “Development of diagnostic tools for Porcine circovirus 2 (PCV2), an emerging pathogen” with a budget outlay of ₹23 lakhs sanctioned by Department of Science and Technology, New Delhi has been implemented at this centre.
- A total of 54 Veterinary Microbes received from various participating Departments of TANUVAS were handed over to Veterinary Type Culture Network Project, Hisar.
- Inactivated Classical swine fever vaccine was released on 17th July, 2013 by the Vice-Chancellor, TANUVAS, Chennai-7, during the farmers meeting conducted in continuation of International conference on Emerging and Transboundary diseases of global importance. An experimental animal study was performed to assess the duration of immunity produced by BEI inactivated and adjuvanted swine fever virus vaccine. Safety and Potency studies of the vaccine under field conditions are being monitored.

Laboratory Animal Medicine, Madhavaram Milk Colony, Chennai

- ❖ This is a breeding unit of laboratory animals like rats, mouse and guinea pigs. This unit supplies laboratory animals to research scholars on cost basis. During the period under report, rats (677) and mice (439) were sold to researchers, through which a sum of ₹ 1,79,300/- was earned.





- ❖ During the year 2013-14, a Certificate Course in Laboratory Animal Sciences (CCLAS) was organized as per FELASA C category standards (FIRST TIME IN INDIA) for 29 participants representing Government organizations and private industry.

Pharmacovigilance Laboratory for Animal Feed and Food Safety, MMC, Chennai

- ◆ This laboratory is involved in analysis of mycotoxins, pesticides and drug residues in animal feed and food.
- ◆ During the period under report, 2062 samples were analysed for mycotoxins and pesticide residues. The results were communicated to the entrepreneurs / farmers so as to enable them to formulate their animal/poultry feed free from toxic residues.
- ◆ The unit also renders diagnosis services in Animal Disease outbreak pertaining to toxicity (namely Zincphosphide, Nitrate/Nitrite, Hydrocyanic acid etc).
- ◆ During the reporting period, five training programmes on analysis of pesticide residues in milk, meat and egg were given to the needy veterinarians.
- ◆ The revenue generated by the analysis of samples during this period was ₹ 6,07,600/-.

Animal Feed Analytical and Quality Assurance Laboratory, Namakkal



Facilities at AFAQAL, Namakkal

- ◆ With the financial assistance of APEDA, New Delhi under Modernization /up gradation of Animal feed analytical laboratory for testing of animal/poultry products, this laboratory was strengthened with latest equipments and infrastructure.
- ◆ A total of 19880 samples were received and 48792 tests were carried out at this laboratory. Fifty-four different parameters covering proximate, mineral, adulterants, contaminants and mycotoxins in feed, feed ingredients, and vitamin concentration in premixes were analysed. Results were immediately dispatched by email and SMS to the farmers.

- ◆ During the reporting period, 103 weather based bulletins (bi-weekly) were issued for the benefit of poultry and agricultural farmers in Namakkal, Salem, Dharmapuri and Krishnagiri districts of North West Agro climatic zone of Tamil Nadu.
- ◆ The revenue generated during 2013-14 was ₹ 64.83 lakhs.

Poultry Disease Diagnosis and Surveillance Laboratory, Namakkal

- ◆ Haemagglutination test was conducted for 528 samples. Newcastle disease (ND) virus antigen was detected in 238 samples and Infectious Bronchitis virus antigen in 16 samples.
- ◆ A total of 52,473 blood samples collected from 825 flocks were tested by Haemagglutination Inhibition test. Out of 1165 water samples analyzed, 625 samples (53%) were found to be contaminated with coliforms.
- ◆ 581 feed and clinical samples were tested for microbial analysis, of which 87 (14.97%), 47 (8.08%), 38 (6.54%), 25 (4.30%), 5 (0.86%), 4 (0.68%), 1 (0.17%) and 1 (0.17%) samples were found to be contaminated with Clostridium spp., E.coli, Staphylococcus spp., Pasteurella spp, Ornithobacterium rhinotracheale, Pseudomonas spp., Mannheimia spp and Riemerella spp respectively.
- ◆ Out of 626 samples screened for Salmonella organisms, two samples found positive for Salmonella spp.
- ◆ A total of eight training programmes were organized for the poultry farmers and field veterinarians. One seminar was organized on avian influenza awareness and biosecurity measures in poultry farming.
- ◆ The revenue generated during the year 2013-2014 was ₹7,19,707/-.

Avian Disease Laboratory, Thalaivasal

- ◆ In this laboratory, 4870 serum samples were tested by Haemagglutination Inhibition test for Ranikhet disease antibody profiling.
- ◆ Out of 79 blood smears of dairy animals examined, 22 percent of the samples revealed positive for blood parasitic infestation. Suitable control measures were advised to the dairy farming community.

- ◆ Totally, 233 water samples were analysed for the establishment of new poultry farms. The results revealed that the TDS level was below 500 ppm in 60 percent of the samples, 500-1000ppm in 35 percent of the samples and above 1000ppm in 5 percent of samples and the farmers were advised accordingly.
- ◆ A total of 656 poultry post mortems, 78 farm visits and 226 farmers' queries were attended. Least cost feed formulations were given to the 66 poultry farmers.
- ◆ Revenue generated during this reporting year was ₹ 31,569/-.

FINANCE





12. FINANCE

During the year 2013-14, grants totalling to ₹ 24325.06 Lakhs were received from various sources as detailed below :

	(₹ in Lakhs)
Government of Tamil Nadu	20684.62
Agencies of Government of Tamil Nadu	221.41
Indian Council of Agricultural Research	1365.05
Departments of Government of India	1164.23
Private and Other Agencies	303.39
Revenue generated	586.36
Total	24325.06

Finance and Accounts

Revenue

The various sources of finance for administering the University are detailed below:

i. Government of Tamil Nadu

Under section 34 of TANUVAS Act 1989, the Government of Tamil Nadu released the following non-lapsable grants to the University.

- ◆ A grant not less than the net expenditure incurred in the year in respect of the activities of the institution of Veterinary and Animal Sciences and allied sciences and such other Government Departments relating to Veterinary and Animal Sciences and allied sciences are transferred to the University.
- ◆ a grant not less than the estimated expenditure on pay and allowances of the staff, contingencies, supplies and services of the University; and
- ◆ a grant to meet such additional items of expenditure, recurring and non-recurring, as the Government may deem necessary for the proper functioning of the University.

The State Government has released the following grants during the year 2013-2014 :

	(₹ in Lakhs)
Non-Plan - Veterinary	10912.68
Plan - Veterinary (including New schemes)	8277.87
Plan - Fisheries (including New Schemes)	1417.07
GOI Centrally sponsored (50% State Share)	77.00
Total	20684.62

ii. Indian Council of Agricultural Research

The ICAR has continued to support the University by releasing the following grants during the year :

	(₹ in Lakhs)
For 100% financed schemes	715.20
For 75% financed schemes	145.67
Development grant	504.18
Total	1365.05

iii. Government of India

The Government of India has sanctioned grants for implementing various sponsored research programmes during the year as detailed below :

	(₹ in Lakhs)
GOI	1087.23
GOI 50% Share	77.00
Total	1164.23

iv. Agencies

Agencies of Government of Tamil Nadu	221.41
Other Private Agencies and Training Grants	303.39
Total	524.80

v. Revenue Generated

The University generated income by way of fee from services, Students fees, sale of farm produces and value added Products, fees for hospital services, under plan and Non-plan schemes	586.36
Grand Total	24325.06

Expenditure

The actual expenditure incurred during 2013-14 (Un-audited) under different grants are detailed below:

i. Government of Tamil Nadu Grants :

	(₹ in Lakhs)
Non-Plan - Veterinary (Including pension)	11334.38
Plan - Veterinary (including New schemes)	8096.80
Plan - Fisheries (including New Schemes)	1202.69
Total	20633.87

ii. ICAR Schemes Grant

100% financed schemes	940.18
75% financed schemes	163.74



100% ICAR Development Grant	504.77
Total	1608.69

iii. Government of India Scheme Grant	2492.56
iv. Tamil Nadu Government and Private Agencies Grant	2589.91
Grand Total Expenditure	27325.03

The split up details of the actual expenditure is given below :

Sl. No.	Details	(₹ in lakhs)
1.	Pay and allowances (including pension)	12798.55
2.	Recurring contingencies	4512.00
3.	Library books and Journals	130.72
4.	Non-recurring	9883.76
	Total	27325.03

PUBLICATIONS



13. PUBLICATIONS

Abstract

1.	No. of Research articles	543
2.	No. of Popular articles	549
3.	No. of Books / Manuals	35

Research Articles

Details of selected publications:

Cattle and Buffaloes

- Akila N., and K.Senthilvel, 2014. Productive and reproductive performance of buffaloes. *Ind. Vet. J.*, 91(3): 91-92
- Anandha Prakash Singh D., V.Ramesh Saravana Kumar, K.Sivakumar, V.Ramesh and J.Muralidharan, 2013. Feeding management practices of dairy farmers under village conditions of Tamil Nadu. *Ind. J. Field Vet.* 8(4): 11-13
- Arunachalam K., M.Raman, T.J.Harikrishnan and T.Anna, 2013. Efficacy of deltamethrin against lice infestation in buffalo calves. *Buffalo Bulletin* 32 (03) : 162 – 164
- Balakrishnan Govindan and Parimal Roy, 2014. Isolation of leptospire from Bovines. *Ind. Vet. J.*, 91: 46 – 48
- Balasubramanian S., N.Arunmozhi, Ravisunder George, T.Sarath and R.C.Rajasundaram, 2013. A rare case of unilateral bartholin's gland cyst in a jersey crossbred cow. *Ind. J. Vet. Surgery* 91(4) : 88-89
- Balasundaram B. and V.Jayalalitha, 2013. Reproductive Behaviour in Cattle. *Adv. Bio Tech.*, 12 (07S):10 -11
- Bino Sundar S.T. and Placid E.D'Souza, 2013. Morphological characterization of *Setaria* worms collected from cattle. *J. Parasitic diseases*. Doi: 10.1007/s12639-013-0399-x.
- Ganapathi P., R.Rajendran, A.Subramanian and S.Meenakshisundaram, 2013. Bargur cattle: Characterisation and management practices. *Ind. Vet. J.*, 90: 9-10
- Ganesan P.I., 2013. Diagnosis of Brucella infection in dairy animals. *Ind. Vet. J.*, 90(3) : 126
- Ganesan P.I., 2013. Screening bovine tuberculosis by PCR. *Ind. Vet. J.*, 90(7) : 97-98
- Ganesan P.I., 2013. Prevalence of tuberculosis, Johne's disease and brucella in elite cows. *Ind. Vet. J.*, 90 (8) : 107
- Ganesan P.I., 2013. Diagnosis of bovine T.B. by gamma interferon assay. *Ind. Vet. J.*, 90(8) : 108-109
- Kumaravel A., 2014. Histology and histochemistry of amygdala of Indian buffaloes. *Ind. Vet. J.*, 91(1) : 38-40
- Latchumikanthan A., C.Soundararajan, S.A.Basith and G.D.Raj, 2013. Serodiagnosis of bovine fasciolosis by Dot-enzyme immuno assay in Chennai. *J. Parasitic Diseases*. 38(1):32-35
- Latchumikanthan A. and C.Soundararajan, 2013. Serodiagnosis of bovine fasciolosis by enzyme linked immuno sorbent assay in Chennai, Tamil Nadu. *Ind. J. Anim. Sci.*, 83 (6): 587-590
- Madheswaran R., M.Subramanian, A.Natarajan and G.A.Balasubramaniam, 2013. Nitrate Poisoning in crossbred white cattle in Namakkal. *Ind. Vet. J.*, 90 (12) : 81-82
- Madheswaran R., A.Kumaresan, S.Kathirvel, K.Jayakumar, S.Sivaseelan, G.A.Balasubramaniam, P.Balachandran and A.Arulmozhi, 2014. Periorbital frontal sinus osteoma in a jersey cow. *Ind. Vet. J.*, 91(5) : 91-92
- Palanisamy M., C.Veerapandian, S.Manokaran, A.Palanisamy, M.Selvaraju and R.Ezakial Napoleon, 2013. Influence of follicular size on oocyte quality, yield and recovery rate in buffaloes. *Ind. Vet. J.*, 90 (12) : 49-52
- Pavulraj S., S.Amsaveni, L.Kalaiselvi and S.Ramesh, 2013. Screening of *Staphylococcus aureus* isolates from mastitis for antibacterial susceptibility pattern and betalactamase production. *Ind. J. Vet. Anim. Sci. Res.*, 9 (4) : 300
- Puvarajan B., 2013. Effect of area specific mineral mixture supplementation in anoestrous crossbred heifers. *Ind. J. Field. Vets.*, 8(4):43-44
- Rajendran D., G.Kumar, S.Ramakrishnan and K.Shibi Thomas, 2013. Enhancing the milk production and immunity in Holstein Friesian crossbred cow by supplementing novel nano zinc oxide. *Res. J., Biotechnology*. 8 (5)
- Samuel Masilamoni Ronald B., S.Hemalatha, R.Mahaprabhu, P.Tensingh Gnanaraj, P.Kavitha Rani and K.Kumanan, 2014. Septicemic Mannheimiosis in Sahiwal cattle. *Global J. Sci. Frontier Research : D* 14 (2)
- Sangaran A. and Lalitha John, 2013. Antigen based detection of cystic echinococcosis in buffaloes using ELISA and Dot EIA. *Buffalo Bulletin*. 32 (2) : 999-1001
- Sangaran A. and Lalitha John, 2013. Incidence and organ wise involvement of hydatidosis in buffaloes. *Buffalo Bulletin*. 32(2) 1009-1010
- Saranya K., S.Pavulraj, L.Kalaiselvi, S.Amsaveni and S.Ramesh, 2013. Antibacterial susceptibility profiles of coliforms isolated from bovine subclinical and clinical mastitis against fluoroquinolones. *Indian J. Vet. Anim. Sci. Res.*, 9 (4) : 279
- Senthilkumar A., R.Uma Rani and N.Sri Balaji, 2014. Efficacy of PGF2 alpha with Ceftiofur sodium in toxic or septic puerperal metritis in dairy cows. *Ind. J. Field Vets.*, 9 : 87
- Senthilkumar K., S.Manokaran and C.Chandrasanan, 2013. A comparative appraisal of serum progesterone level during natural and induced estrous in fertile and non-fertile cows. *Ind. Vet. J.*, 90(9) :12-14



- Senthilkumar S., N.Rajendran, S.Dharmaceelan, S.Kathirvel, M.Subramanian and P.Selvaraj, 2013. Effect of butorphanol and buprenorphine on inhalant sparing and gas concentrations during low flow isoflurane anaesthesia in cattle. *Advances in Anim. and Vet. Sci.*, 29: 29
- Sivaraman S., A.Velavan, G.Ponnudurai and K.Krishnakumar, 2014. Recurrent bloat due to mature amphistome in a bullock. *Ind. Vet. J.*, 91- 96
- Thiruvenkadan A.K., R.Rajendran and J.Muralidharan, 2013. Buffalo genetic resources of India and their conservation. *Buffalo Bulletin* 32:227-235
- Vinothini M. and K.Natchimuthu, 2013. Identification of Indicators of Sustainable Dairy Farming. *J. Community Mobilization and Sustainable Dev.*, 8 (2) : 234-240
- Sheep and Goats**
- Arulnathan N. and C.Bandeswaran, 2013. Effect of different feeding systems on growth performance and cost economics in Mecheri lambs. *Ind. J. Field Vets.*, 9 : 17-18
- Arulnathan N. and C.Bandeswaran, 2013. Trichobezoars induced abomasal impaction in a Mecheri Sheep. *Ind. Vet. J.*, 90 (9) : 60-61
- Arunachalam K., T.J.Harikrishnan, T.Anna and G.A.Balasubramanian, 2013. Anthelmintic resistance in GIN of sheep and goats, *Ind. Vet. J.*, 90 (10); 69-70
- Arunkumar S. and S. Abdul Basith, 2013. Immune response of excretory/secretory antigen of *Haemonchus contortus* in sheep. *Ind. J. Small Rumin.*, 19(2) : 175-178
- Bandeswaran C., M.Murugan and N.Kumaravelu, 2013. Performance of sheep integrated in Bajra-Neem + *Gliricidia* agri-silvi system. *Range Management and Agroforestry*. 34 (1) : 142-144
- Bharathy N., V.B.Ragavendran, D.Jayanthi and N.Murali, 2013. Trichobazors in sheep. *Ind. Vet. J.*, 90 (10): 74
- Chitra R., S.Rajendran and S.Sureshkumar, 2013. A rapid test for estimating total protein in goat milk by Amido Black 10B dye. *Ind. J. Small Rumin.*, 19(2):187-189
- Devendran P., D.Cauveri, N.Murali and P.Kumarasamy, 2013. Growth profile of Madras Red sheep in farmer's flocks. *Ind. J. Small Rumin.*, 19 : 22-24
- Gunasekaran S., K.Viswanathan, C.Bandeswaran, D.Balasubramaniam and R.Venkataramanan, 2013. Effect of supplementation of *Stylosanthes scabra* raised in the hortipasture model on goats. *Range Management and Agroforestry*. 34 (1): 98-100
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