

EPC Newsletter

Equine Production Campus, Bikaner

Vol I : Jan. to Dec. 2015

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From the Director's Desk

It is a matter of great pleasure for me to introduce the first newsletter from Equine Production Campus of ICAR-NRCE. This endeavour is in direction of our commitment to serve our stakeholders and keep them abreast with the latest in the field of equine management and husbandry across the globe. Also, through this initiative, we wish to showcase and share our activities and to let you all be informed as to how we are serving our community. Further, the declining equine population in India warrants collaborative approach from researchers, policy makers and stakeholders to augment the productivity and utility of the beautiful species which has etched its history with glory and pride in serving mankind.



To address the equine related issues ICAR-NRCE is untiringly making efforts on equine health, production and management aspects. The health aspects are being addressed by highly experienced scientific faculty with state of art research facilities at the main campus at Hisar, while the Equine Production Campus at Bikaner focuses on augmenting the productive performance of equines. The campus has cryopreserved semen of indigenous horse breeds (Marwari, Kathiawari, Zanskari and Manipuri) and donkeys (indigenous donkeys and exotic Martina Franca) for germplasm conservation and artificial insemination. The current research is focussed on production of cloned horses, which would enable conservation and production of elite equines. Optimum work capacity of mules and donkeys in draught and pack load has been identified. Work is under progress to develop the area specific mineral mixture for equines and characterization of donkey milk for its therapeutic and cosmetic properties. Scientists at the campus are also investigating colic and lameness for better understanding of predisposing and etiological factors for better management of these commonly occurring clinical problems in equines. EPC is also actively involved in extension activities such as organizing equine health camps and kisan goshthis with equine owners so that they can interact directly with the scientists and find solution to their problems.

The institute has been honoured with Sardar Patel Outstanding Institution Award for the year 2014 and I congratulate all scientists and staff for exhibiting remarkable progress in equine health, production, conservation and management. I acknowledge their sincere efforts and cooperation rendered to achieve the excellence in the mandated areas.

We shall like to have critical suggestions from readers to our future editions. I also chose this forum to appeal to you all to stay tuned to us and contact us through email, web, facebook and watch videos posted by us on youtube. I compliment the scientists of Equine Production Campus, Bikaner for bringing out the first ever issue of the Newsletter and hope their efforts would benefit the farmers and other stakeholders.

B. N. Tripathi

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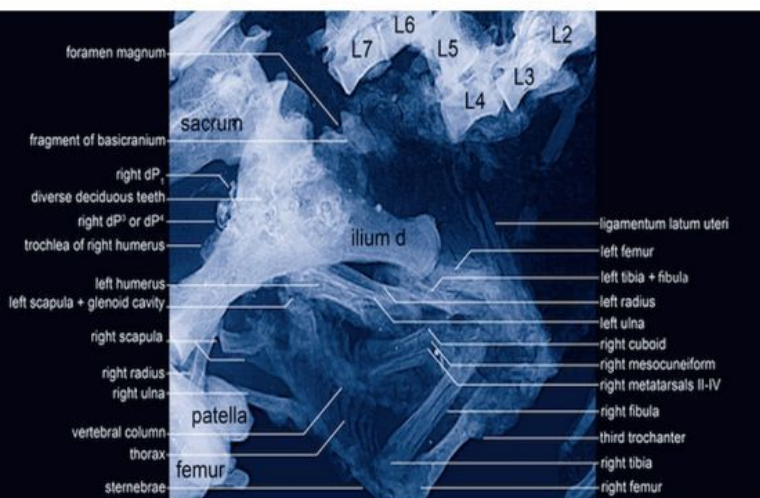
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Reproductive system analysis in a well preserved fetus of the European Eocene Equoid *Eurohippus messelensis*



Skeleton of a mare of *Eurohippus messelensis* with fetus (white ellipse) inventory No. SMF- ME-11034 Source: Sven Tränkner/ Plos One Franzen et al (2015)

The best fossil of a pregnant mare (European Eocene Equoid *Eurohippus messelensis*) with its fetus was discovered and excavated by a team of the Senckenberg Research Institute Frankfurt in 2000 and archived in the Institute's Department of Messel Research under the inventory No. SMF-ME-11034.



The fetus analysed by high resolution micro x-ray of bones. Source: Jörg Habersetzer/Plos One Franzen et al (2015)

Franzen and his team analysed the fossil in detail using advanced techniques such as scanning electron microscopy and high resolution micro x-ray techniques, for its paleobiologic and evolutionary significance. The fetus has an almost complete postcranial skeleton and probably the pregnant mare was in late gestation. The apparent intrauterine position of the fetus was normal for the phase of pregnancy. Uteroplacenta and a broad uterine ligament resembled closely to the liamentum latum uteri of recent mares of *Equus caballus*. (Source: Franzen et al (2015). PLoS ONE 10(10): e0137985. doi:10.1371/journal.pone.0137985)

Isolation and culture of viable mesenchymal stem cells from the ligament of dead horses

A study at the University of Liège Belgium (Alsook et al., 2015),

has reported successful isolation of mesenchymal stem cells from equine cadaver suspensory ligaments (EC-MSCs) within 48-72 hours of post-mortem. These cells were maintained for 20 passages with high cell viability and proliferation. EC-MSCs could be a promising alternative source to MSCs from bone marrow (BM-MSCs) for tissue engineering and stem cell therapy in equine medicine. (Source: Alsook et al (2015). Stem Cell Research & Therapy, 6:253 DOI: 10.1186/s13287-015-0250-7)

Approaches for derivation of induced pluripotent stem cells from cattle

(Doctoral thesis research of Dr. T. Rao at Institute of Farm Animal Genetics, (FLI-Mariensee, University of Veterinary Medicine, Hannover, Germany)

Bovine iPS cells were derived by employing optimized transposon conditions. The study is the first demonstration that biPS cells can be generated by a non-viral transposon system. These results are a major step towards the routine derivation of biPS cells and will facilitate genetic modifications of the bovine genome.

First double transgenic calf produced

First double transgenic calf was produced by the group of scientists in which Dr Rao was associated during his doctoral work at Germany. By adding α -casein promoter and pDesturase gene, for the first time, a triple transgenic calf was produced with venus expression all over, tomato expression in the eye and expression for the Desaturase gene at molecular level. The fibroblasts were isolated from Tr cattle and employed for SCNT, thus establishing the cell-based transposon-mediated transgenesis in cattle.



First double transgenic calf. The calf is expressing td-tomato expression in the eye and ubiquitous venus expression.

Campus News

Visit of dignitaries

Visit of Deputy Director General (Animal Sciences), ICAR, New Delhi

Deputy Director General (Animal Sciences), ICAR, Prof. K.M.L. Pathak visited Equine Production Campus, Bikaner on 30th July 2015. Director, ICAR-NRCE, Dr. B. N. Tripathi and scientists of EPC welcomed the DDG. Prof. Pathak advised the scientists to

development of agriculture oriented technologies and work for the overall development of agriculture and livestock sector.



DDG (AS), ICAR, Prof. KML Pathak with Director, ICAR-NRCE and staff of EPC, Bikaner.

Visit of Shri Dushyant Chautala, Hon'ble Member of Parliament, Govt. of India and Member, Governing Body of ICAR, New Delhi.

Shri Dushyant Chautala, Hon'ble Member of Parliament, Govt. of India and member of governing body of ICAR, New Delhi visited Equine Production Campus, Bikaner on 4th September 2015. Director, Dr. B. N. Tripathi welcomed Sh. Chautala & apprised him of the contributions of the campus in equine welfare.



Sh. Chautala, Hon'ble Member of Parliament interacting with Director and scientists in the laboratory.

Sh. Chautala Ji visited the research laboratories, equine farm and learnt about the scientific practices of equine husbandry. He appreciated the research contributions of the campus and emphasized on extending the research results to farmers.



Sh. Chautala, interacting with Director and staff of EPC, Bikaner.

Research News

Semen collection, cryopreservation, artificial insemination and pregnancy diagnosis in horses.

Collection of semen from elite Marwari stallions from field
For germplasm conservation and propagation of true to breed Marwari horses, semen was collected from 17 elite Marwari stallions from three stud farms in Rajasthan. In total, 197 semen doses of good quality semen were collected, cryopreserved at farmer's door and kept in the EPC laboratory.



Semen collection from an elite Marwari stallion and processing at farmer's door in Peerkamria, Hanumangarh (Rajasthan)

Artificial insemination and pregnancy diagnosis

The long estrus duration and unpredictable time of ovulation are major constraints in mare reproduction. Ultrasonography facilitates insemination of mares near the time of ovulation, thereby increasing the conception rates. Scientists at Equine Production Campus regularly monitor the reproductive status of mares (of farm as well as field) with the help of ultrasonography machine for artificial insemination and pregnancy diagnosis. During this year, 30 field mares were examined. Efforts were also made to examine the mares per rectum and inseminate them at farmer's doorsteps.



Marwari dam with its foal produced at EPC with frozen semen of elite stallions from field.

Nutrient utilization in equines.

To develop the feeding standards for indigenous equines, in the subtropical desert conditions, dry matter intake (DMI) and dry matter digestibility (DMD) were determined in different classes of equines. The dry matter intake and digestibility coefficient depends on various factors such as type and quality of feed, energy density, class and physiological state of the animals which in turn decide the productive performance of equines. Light working mules and maintenance equines can be well maintained with concentrate feeding @ 0.5% of body weight and the rest 1.0-1.75% of dry matter intake through locally available green and dry roughages. Pregnant mares require an additional 1.0% concentrate mixture in their ration in the last trimester to support the fast growing fetus. However, fast grow-

ing foals require a 1.5-1.75% (of body weight) total concentrate mixture in the ration along with good quality forage *ad libitum*.

Work capacity of indigenous equines.

The work performance of equines depends on various factors such as type of species, breed habitat, adaptation to climate, work duration and intensity of work. Intense work, in terms of higher pack or draught loads, speed and duration adversely affects the work output and health of the animal. Elucidation of work capacity of equines is essential for adopting a suitable duration and intensity of work for deriving maximum work output without causing physiological stress on the animals. With a pack load of 50% of their live body weight, indigenous donkeys weighing 200 kg on an average were able to work optimally to a distance of 10km with speed of 4-5km/h. Higher pack loads induced physiological stress and therefore, not recommended for indigenous donkeys.

Estrous cycle characteristics of Marwari fillies

The onset of puberty reflects the development of functional reproductive cycles in fillies. The age at puberty is a function of not only age but also the body weight of fillies. Additionally, other factors such as breed, season of birth and climate may influence the age at puberty. Therefore, age at puberty is an important criterion for characterizing not only the growth and development of fillies but also their breeding management. On the basis of expression of the first behavioural estrus, the mean age at puberty in Marwari fillies was observed to be 383 days with a mean body weight of 193 kg. Mean duration of estrus was 11.57 days while cycle length was 26 days.

Electrolyte supplementation for race horses.

Significant amount of electrolytes are lost in the sweat of race horses. This loss adversely affects the performance of race horses, especially in the extreme hot and humid climate. Supplementing appropriate amount of electrolytes can prevent several metabolic disorders seen in the horses competing in endurance races. Horses can recuperate quickly from dehydration by electrolyte supplementation. An electrolyte supplementation containing sodium chloride, potassium chloride, calcium chloride and glucose in appropriate proportions was formulated and tested in race horses trained for 20 km trail ride. The supplement significantly improved the post exercise level of ionized calcium and chloride in the circulating plasma, indicating positive prospects of the use of electrolytes in race horses participating in the middle to long distance endurance events.

Extension Activities

Health camps and field visits

Nine health camps were organized by the institute scientists at farmer's door, animals fairs and various District Veterinary Hospitals.



Equine health camp at Ramdev Pashu Mela, Nagore

Details of health camps and field visits

Place	Date	Team Members
Ramdev Pashu Mela, Nagaur	25-26 Jan, 2015	Dr. Vijay Kumar, Dr. R. K. Dedar and Dr. S. K. Ravi
Dhingsari, Bikaner	02 Feb, 2015	Dr. R. K. Dedar and Dr. S. K. Ravi
Mukam, Bikaner	13 Feb, 2015	Dr. R. K. Dedar, Dr. T. Rao and Dr. S. K. Ravi
Tilwara, Barmer	16-18 March, 2015	Dr. R. K. Dedar, Dr. P. A. Bala, Dr. S. K. Ravi and Sh. S. N. Paswan
Dhingsari, Bikaner	12 May, 2015	Dr. T. Rao, Dr. S. K. Ravi and Dr. J. Singh
Balvada Village, Jalore	28 May, 2015	Dr. R. K. Dedar and Dr. S. K. Ravi
Paota Chowk, Jodhpur	21 August, 2015	Dr. R. A. Legha, Dr. T. Rao, Dr. S. K. Ravi and Dr. J. Singh
Kachla Ghat, Badaun	9 Sept, 2015	Dr. S. C. Yadav, Dr. T. Rao, Dr. A. K. Raut and Dr. S. K. Ravi
Pushkar, Ajmer	21 Nov, 2015	Dr. R. K. Dedar and Sh. S. N. Paswan



Equine health camp near Paota Chowk, Jodhpur



Equine health camp at Kachhla Ghat, Badaun (UP)

Kisan Goshthi, Hindi Pakhwada and Campus Foundation Day celebrations

On 26th Foundation Day of EPC, a Kisan Goshthi and Hindi Pakhwada Valedictory Function was organized on 28th September 2015. Dr. B.N. Tripathi, Director, ICAR-NRCE presided over the function. The chief guest, Prof. Tribhuvan Sharma, Dean, COVAS, RAJUVAS, Bikaner and special guest Dr. N.V. Patil, Director, ICAR-NRCC, Bikaner graced the occasion. Equine owners and farmers participated in the interactive meet with the dignitaries and scientists. Prof. Tribhuvan Sharma emphasized the need for greater cooperation and interaction between farmers and scientists so that farmers can derive maximum benefit from the government schemes and technologies developed by the scientists. Dr N. V. Patil emphasized the farmers to feel free to contact any of the scientists of ICAR-NRCE & ICAR-NRCC to find solution of the problems they face in equine and camel husbandry. Dr. B. N. Tripathi highlighted the importance of Rajbhasha 'Hindi' in the offices of the Union Govt. and stressed that all staff should derive greater satisfaction, pride and happiness in carrying out their official work in Hindi. He also emphasized that farmers must obtain technological knowledge as much as possible from scientists not only to solve the agricultural problems but also to improve the agricultural production. During the meet, Dr. Hema Tripathi, Principal Scientist (Animal Science Extension) informed the farmers about various schemes implemented by the government for farmers. Her presentation created lot of interest amongst farmers and they enquired in detail about the government schemes. The chief guest and other dignitaries distributed prizes to the winners of the competitions organized during Hindi Pakhwada (14th to 28th Sept 2015).



Chief guest, Dr. Tribhuvan Sharma addressing the farmers and EPC staff during Kisan Goshthi on Campus Foundation day



Director, ICAR-NRCE addressing the farmers and staff during Kisan Goshthi on Campus Foundation day

Azolla Cultivation

Cultivation of *Azolla pinnata* was initiated at EPC to use it as a protein rich feed for equines. Azolla was grown as per the Ajmer Model (Mathur et al., 2013) with slight modifications. On a trial basis, it was fed to 6 adult indigenous horses @2kg/horse/day. After an initial adjustment to its flavour, freshly harvested and cleaned azolla was well relished by the horses. *Azolla pinnata*, commonly known as feathered mosquito fern and water velvet, is found in temperate and subtropical regions throughout the world. It is being used as biofertilizer by rice farmers in China and Vietnam for 1500 years. The excellent nitrogen fixation (@25kg/ha) that occurs in its symbiotic relationship with the blue green algae cyanobacteria (*Anabaena azollae*), has led to its widespread use in the rice fields as biofertilizer in Southeast Asia. Its use as livestock feed is also increasing. In the livestock feed, it is primarily used as a protein supplement due to higher crude protein content (20-35%). It also has high lysine and vitamins A & B. Additionally, higher calcium, phosphorous, potassium and magnesium contents make azolla a useful feed supplement for livestock, poultry and fish.

Progressive Implementation of Official Language

The official language implementation committee of EPC was reconstituted this year. Mr. Anil Kumar Sharma (Official Language Officer, DRM Office, Bikaner and Member Secretary, TOLIC Bikaner) was special invitee in the quarterly meeting held on 31st December 2015 in the chairmanship of Incharge EPC, Bikaner. On this occasion, Mr. Sharma also conducted a workshop on the use of unicode in the official language on computers.



Quarterly meeting of campus OLIC on 31.12.2015

Implementation of Mera Gaon Mera Gaurav Scheme

Under the auspices of the Mera Gaon Mera Gaurav scheme, the scientists adopted villages (Himtasar, Panpalsar, Hadla Bhatiyar, Hadla Rawlotan, Gigasar, Kotri, Surdhana Chauhanan and Surdhana Padiharan) of Bikaner district within 100 km radius and carried out bench mark survey & extension programmes. Meetings were held with the farmers and solutions/suggestions were provided to them to overcome the problems related to agriculture and animal husbandry.

Tree plantation (Vriksharopan) programs

Institute organized tree plantation programs in association with

Mahaveer International, Bikaner (Non Governmental Organization) on 10th August 2015 and on 28th Sept 2015 on the occasion of the Campus Foundation Day.



Director, ICAR-NRCE and Members of Mahaveer International, Bikaner planting trees at EPC, Bikaner on 28th Sept. 2015

International Yoga Day Celebration

International Yoga Day was celebrated on June 21, 2015 in the campus. Dr. R. A. Pachauri & Mr. N. S. Chauhan conducted the yoga session for the staff & their family members on this occasion.

Awards/Honours

ICAR award to the institute

On the occasion of 87th Foundation Day and ICAR Award Ceremony on 25th July, 2015 at Patna, Dr B.N. Tripathi Director ICAR-NRCE received 'Sardar Patel Outstanding ICAR Institution Award 2014' for the Small Institute category from Hon'ble Prime Minister Shri. Narendra Modi Ji.



Director, ICAR-NRCE, Hisar receiving the award from Hon'ble Prime Minister Shri Narendra Modi.

Shri Keshri Nath Tripathi, Hon'ble Governor, Bihar and Shri Nitish Kumar, Chief Minister, Bihar, Shri Radha Mohan Singh, Union Minister of Agriculture, Dr. Sanjeev Kumar Balyan and Shri Mohan Bhai Kundariya, Union Ministers of State for Agriculture and Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR were present on the occasion.

Gold Medal for best PhD Thesis in Veterinary Medicine

Dr. Ramesh Kumar Dedar, Scientist (Veterinary Medicine) was awarded the Gold Medal for best PhD Thesis in Veterinary Medicine in the first convocation of Rajasthan University of Veterinary and Animal Sciences, Bikaner on 16th September 2015. The title of thesis was "Biomarkers of oxidative stress and

therapeutic efficacy of antioxidants in varying ambient temperature".



Dr. Ramesh Kumar Dedar receiving Gold Medal.

Award of PhD Degree from the University of Veterinary Medicine, Hannover, Germany

Dr. Rao T, Scientist (Animal Reproduction) was awarded the PhD Degree by Chancellor, University of Veterinary Medicine, Hannover, Germany for his Thesis titled "Approaches for derivation of Induced Pluripotent stem cells from cattle at Institute of Farm Animal Genetics, Friedrich Loeffler Institute (FLI), Mariensee) under ICAR International Fellowship.



Dr. Rao T, receiving the PhD Degree.

Best Poster Presentation

Dr. R. A. Legha received the second best poster presentation award for the poster titled 'The nutrients intake and their digestibility in adult indigenous donkeys in arid region of Rajasthan' authored by Legha. R. A., Bala. P.A., Pal Yash and Tripathi. B. N. in 3rd Biennial National Conference of the Indian Academy of Veterinary Nutrition and Animal Welfare on "Interventions in Livestock Production-cum-Health and Crop Mixed Farming for Nutritional Security" organized at College of Veterinary and Animal Sciences, CSK HPKV, Palampur from November 04-05, 2015.

Best Oral Presentation

Dr. S. K. Ravi and his team was awarded with the Best Presentation Award in Young Scientist Category for the expert lecture on "Supplementation of omega-3 fatty acids in diet improved ovarian function, conceptus development and conception in mare" authored as S. K. Ravi, H. Kumar, S. Vyas, K. Narayanan, Susavi Kumari and R. A. Legha in XXXI Annual Convention of The Indian Society for Study of Animal Reproduction (ISSAR) & National Symposium on Current Challenges and Opportunities in Animal Reproduction organized by Department of Obstetrics & Gynecology Veterinary College, Bengaluru from 3-5 December, 2015.

Personalia

Joinings

Dr Ram Abtar Pachauri, Technical Officer joined the Equine Production Campus, Bikaner on 16th April 2015 on transfer from ICAR-Central Institute for Research on Buffaloes, Hisar.

Promotions

Mr. Kamal Singh promoted as Technical Officer T-6.

Trainings

Dr. P.A. Bala Scientist (Animal Nutrition) attended a winter school on "Livestock and climate change: Challenges and ways ahead for sustainable production" at ICAR-National Institute of Animal Nutrition and Physiology, Adugodi, Bangalore from 1-21 October, 2015.

Workshops

Dr(s) Ramesh Kumar Dedar, P.A. Bala, T Rao and Sanjay Kumar Ravi attended one day workshop on "Disaster Management in Animals: A Renewed Approach and Future Vision" on February 20th, 2015 at the College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner.

Message from the In-charge, EPC, Bikaner

The Equine Production Campus at Bikaner is a sub campus of ICAR-National Research Centre on Equines, Hisar which was established on 28th September 1989. In the last decade, the campus acquired scientific strength and developed excellent farm and infrastructure. The campus has three breeds of horses, i.e., Marwari, Manipuri, and Zanskari in the livestock farm and two donkey breeds, Martina Franca and indigenous donkeys. In the agricultural farm, fodder crops such as oats, barely, pearl millet, hybrid napier, sorghum and sudan grass are grown.



The research at the campus got an impetus when a new laboratory cum administrative block, a rest house, sick line and quarantine blocks were constructed. The scientists at the campus work diligently not only to develop new technologies but also to address the farmers' problems by organizing extension activities and health camps at their doorsteps. I express my gratitude to the Director, ICAR-NRCE for his vision and wholehearted support in all spheres of equine research and management which led us to achieve various awards and honors this year. I also congratulate the editorial team for bringing out the first EPC Newsletter of the year 2015.

R. A. Legha





Director and Staff of EPC with ICAR award

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