



75
Azadi Ka
Amrit Mahotsav



ICAR-NIHSAD *Newsletter*

VOLUME: 9 (1)

JANUARY-JUNE, 2023

INDEX

Technology Released	2
Research Highlights	2
Celebrations & Events	4
Meetings	6
Extension Activities	7
Awards, Honors & Recognitions	8
Capacity Building	9
Personnel	11

DIRECTOR'S DESK

Greetings from NIHSAD!

It brings me immense pleasure to highlight ICAR-NIHSAD's work and achievements in 2023. This year has been marked by remarkable advancements and significant achievements that underscore our commitment to safeguarding animal health through cutting-edge research, technological innovation, and comprehensive disease surveillance.

One of the most important achievement of the institute this year has been the release of Competitive ELISA Kit for detecting bovine viral diarrhoea (BVD) p80 antibodies in cattle which represent significant milestones in our efforts to enhance surveillance and control of BVD in India.

The commitment of the institute to research in the area of emerging and exotic animal diseases has kept pace with global scientific breakthroughs and genomics-based research. Our efforts for surveillance of avian influenza, lumpy skin disease, canine coronaviruses and African swine fever viruses have provided invaluable insights into the epidemiology and molecular characterization of these pathogens, facilitating informed decision-making and targeted interventions.

The institute has also organized various trainings, workshops and talks etc. for different stakeholders including farmers and livestock owners, veterinarians, scientists, and entrepreneurs. The institute has been actively involved in organizing various important activities under government prioritized programmes like World Intellectual Property Day, International Yoga Day, Animal Health and Progressive Poultry Rearing Workshops etc.

I congratulate team of the institute for all of their scientific and other achievements. It gives me immense pleasure to present this issue of newsletter to the readers.



(Aniket Sanyal)

EDITORIAL BOARD

Dr. S. B. Sudhakar
Dr. S. Nagarajan

PHOTOGRAPHIC ASSISTANCE

Mr. R.K. Shukla
Senior Technical Officer

Mr. S.B. Somkuwar
Technical Officer

TECHNOLOGY RELEASED

Competitive ELISA kit for detection of bovine viral diarrhoea (BVD) p80 antibodies in cattle

The Competitive ELISA (C-ELISA) kit for detection of bovine viral diarrhoea (BVD) p80 antibodies in cattle, is intended for serological diagnosis of BVD. It is based on the recombinant NS3 antigen of an Indian BVDV-1 isolate and anti-NS3 monoclonal antibody. This is the first indigenously developed BVD antibody detection

kit, which may be a suitable substitute of imported commercial kits. The technology is user friendly at the veterinary diagnostic lab settings and can aid in surveillance and control of BVD in cattle in India. The technology has a reasonable benefit cost (B:C) ratio and has a better prospect of transfer/commercialization and reaching the stakeholders in future. This technology was dedicated to the nation on the NIHSAD Foundation day (23rd June), 2023.



RESEARCH HIGHLIGHTS

Molecular Epidemiology of H5N1 Avian Influenza Viruses

Four HPAI H5N1 viruses isolated from chicken samples from Bihar, Jharkhand and Kerala, and one H5N1 virus isolated from a wild bird sample from Maharashtra were sequenced and phylogenetic relationships were reconstructed. In the tree, the H5N1 viruses isolated in 2023 in India grouped into two major genetic clades 2.3.2.1a and 2.3.4.4b. Within clade 2.3.2.1a, the isolates grouped with H5N1 viruses circulating in SAARC countries including Bangladesh, Bhutan, India and Nepal indicating persistence of the virus in the region. While in clade 2.3.4.4b, the Indian isolates grouped

with contemporary H5N1 viruses isolated in Eurasia, Africa and North America indicating widespread circulation of the virus clade.

Emergence of lumpy skin disease in Himalayan yaks in Himachal Pradesh, India

Lumpy skin disease (LSD), caused by lumpy skin disease virus (LSDV), is a transboundary viral disease with high impact on cattle production and farmers' livelihoods. India is facing the scourge of LSD epidemics since 2019. LSDV is highly host specific and causes disease primarily in cattle and occasionally in water buffalo and other bovines. However, there is no report on LSDV infection in yaks (*Bos grunniens*) from India. Since domestic



cattle have been infected with LSDV widely during the 2022 LSD outbreaks in the northern Indian state of Himachal Pradesh, we investigated the suspected cases of LSDV infection in domestic yaks (*Bos grunniens*) from two villages of Shimla district. Affected yaks showed nasal discharge, fever (103-104 F), extensive skin eruptions and nodules on the muzzle, neck (lateral aspect), abdominal and perineal region. However, skin nodules (discoid with flattened surface) were prominent on the muzzle. Both the capripoxvirus (CaPV)-screening real-time PCR and the LSDV wildtype strain specific real-time PCR showed positive results for nasal swab samples of both yaks confirming natural LSDV infection. Successful isolation of LSDV, nucleotide sequencing and detection of LSDV antibodies further confirmed the natural LSDV infection in yaks. Subsequent genetic and phylogenetic analysis of complete GPCR, RPO30, and EEV gene sequences revealed that although LSDV from the yaks belongs to the LSDV cluster 1.2, it is more closely related to the wild-type strains of LSDV subcluster 1.2.1, found in Africa, Middle East, Europe, Russia and Kazakhstan, in contrast to the dominant LSDV wild-type strain of sub-cluster 1.2.2 circulating in India, indicating a recent introduction of sub-cluster 1.2.1 strain. But they diverged from the 1.2.1 main branch and placed in a separate cluster, indicating emergence of LSDV sub-cluster 1.2.1 variants in India. This was also supported by the EEV nucleotide sequence alignment, which showed that LSDVs from domestic yaks have one unique mutation (G253A), while two mutations (G178A and A459G) were similar to other wild-type strains of LSDV sub-cluster 1.2.1. The GPCR (LSDV011) nucleotide sequence alignment showed that the LSDV from the yaks (ORF of 1134 nucleotides) and local cattle have a 12-nt deletion, similar to that found in contemporary LSDV wild-type strains of sub-cluster 1.2.1. In contrast, the dominant LSDV strain (1.2.2) circulating in India since 2019 have a 12-nucleotides insertion, similar to the historical Kenyan LSDV wildtype strain (NI-2490).

Additionally, LSDV detected in yaks and local cattle were found identical, implying that yaks can become infected with LSDV circulating in local cattle. This is the first report of natural LSDV infection in yaks in India, expanding the host range of LSDV. Further investigations are needed to assess the impact of LSDV infection in domestic yak population and other susceptible bovines.

Complete genome analysis of African swine fever virus isolated from wild boar in Mizoram, India

African swine fever (ASF), considered as the most dreadful swine disease due to its very high mortality, emerged in India in 2020 in two states Arunachal Pradesh and Assam. Subsequently, this highly lethal disease, swiftly expanded its reach to neighboring regions, including Mizoram. The outbreak implicated both domestic pigs and wild boar populations, underscoring the complex dynamics of ASF transmission. The complete genome of African Swine Fever virus (IND/NIHSAD/SD/21_59) isolated from wild boar was sequenced by next generation sequencing platform. The genome spans 190,489 base pairs, including Inverted Terminal Repeats (ITR) at the 5' (1597 bp) and 3' (1122 bp) ends. Comparative genomic analysis revealed nucleotide identity of 99.97% with previously documented Indian isolates, namely IND/AS/SD02/2020, IND/AR/SD-61/2020, and IND/NIHSAD/SD/21_49. The complete genome analyses showed insertion of one extra Tandem Repeat Sequence (TRS) in the extragenic region between I73R and I329L similar to other Indian isolates reported as compared to Georgia/2007 ASFV. This distinctive genomic signature aligns Indian isolates with the IGR II cluster of genotype II, a classification shared with ASFV strains observed in diverse geographic regions such as China, Germany, Vietnam, and Korea.

As compared to complete genome of previous Indian isolates, SNPs were observed in nine genes viz., MGF_110-7L, I267L, MGF_360-21R, MGF_110-14L, ASF_G_ACD_00300, I196L, B475L, B263R, EP1242L. The complete genome

was annotated to 234 putative genes as compared to 194 genes in GA/2007. Global alignment revealed a high degree of nucleotide identity, ranging from 99.96% to 99.97% with other Indian isolates and 99.95% with the Georgia/2007 reference strain. Complete genome based phylogenetic analysis, rooted at mid-point, showed the clustering of Indian isolates within clade 2.2.2 alongside genotype II ASFVs reported during 2007 to 2023 from Georgia, Tanzania, China, Vietnam, Poland, Ukraine, East Timor leste, Estonia, Germany etc.

Further, a focused Phylogenetic analysis of p72-genotype-II viruses revealed a distinct clustering of Indian isolates from Arunachal Pradesh, Assam and Mizoram in a discrete clade along with ASFV/Wuhan/2019. These findings underscore the genetic distinctiveness of the Indian ASF strains within the broader landscape of ASFV diversity and evolution.

Whole Genome Sequencing (WGS) and molecular epidemiological analysis of Canine coronaviruses circulating in the dog population in India

Whole genomes of three Canine coronaviruses detected in dog rectal swab samples including one from Nagpur and two from North Eastern Region (Assam) were sequenced. The complete genomes were amplified by tiling PCR approach using 72 pairs of overlapping primers. Deep amplicon sequencing was done on ONT MinION flowcells. The percent genome coverage and the average depth of the whole genomes ranged from 92.81% to 94.17% and 1028 to 5751, respectively. Phylogenetic analysis based on the whole genome was done with respect to Canine coronavirus whole genome sequence available in NCBI genbank based on geographical region and collection period. All three CCoV genomes sequenced cluster with CCoV Ila genotype, and share homology with CCoV genome reported from India in 2020. These genomes are closest CCoV genomes reported from China. This insight sheds light on the similar characteristics between Asian origin CCoV genomes.

CELEBRATIONS & EVENTS

Republic Day celebrations

The staff members of ICAR-NIHSAD celebrated Republic Day and Independence Day with great enthusiasm and joy on 26th January 2023. The event saw the hoisting of the national flag by the Incharge Director, Dr. H. V. Murugkar. The staff members, along with their family members, attended the function and participated in various activities organized on the occasion. The celebrations reflected the institute's commitment towards honoring and celebrating the country's rich cultural heritage and values.



ICAR-NIHSAD celebrated the World Intellectual Property Day

The World IP day was celebrated by NIHSAD, Bhopal under the Chairmanship of Dr. Aniket Sanyal, Director, on 26th April, 2023 to highlight the role that IP rights, such as, patents, copyrights, designs, trademarks, plant variety, technology licensing, IP auditing, IP litigation play in encouraging innovation and creativity under the theme, Women and IP: Accelerating Innovation and Creativity. Dr. Niranjan Mishra, P.S. & I/C ITMU briefed about the importance of IP and IPR and the global role of WIPO. Mrs. Vidisha Garg, IPR

Specialist in Anand & Anand, NOIDA delivered a lecture on Overview of Patent system in India in this event. Director, NIHSAD highlighted the importance of IP for the Institute and the society. All the scientists, staff, young professions and students participated the event.



Celebration of International Day of Yoga on 21st June, 2023 “International Day of Yoga” on 21st June 2023 was observed at ICAR-NIHSAD as per the directives of ICAR and Ministry of Ayush, GOI. On the occasion, a “Yoga Session” as per Common Yoga Protocol (CYP) was organized under the supervision of Dr A K Pateriya, Senior Scientist. Dr. S. B. Sudhakar Senior Scientist conducted the Yoga session for all the staff and their family members. The program was attended by thirty five participants.



Foundation day celebrations

ICAR-NIHSAD, Bhopal celebrated 23rd Foundation Day on 23rd June, 2023. The function was graced by Chief Guest Dr. Abhijit Mitra, Animal Husbandry

Commissioner, Government of India, along with Dr. Umesh Chandra Sharma, President, VCI; Dr. Ashok Kumar, ADG (Animal Health), ICAR; Dr. B. R. Gulati, Director, ICAR-NIVEDI; Dr. R. K. Mehiya, Director, Veterinary Services (MP) and Dr. S. C. Dubey, Ex-Joint Director, ICAR-NIHSAD. The celebrations started with the plantation drive by the dignitaries. Dr. Aniket Sanyal, Director, ICAR-NIHSAD briefed about the genesis and achievements of the institute and hailed the contributions made by the visionaries in veterinary sciences for planning and commissioning the first biocontainment laboratory of India. The Chief Guest, Dr. Abhijit Mitra emphasized the need for continuous communication with DAHD and also elaborated on the coordination between NIHSAD and DAHD. Dr. Ashok Kumar appreciated the work done by NIHSAD on emerging threats to the animal husbandry sector. While the achievements of NIHSAD in the field of exotic and emerging disease were appreciated, the need for BSL4 at NIHSAD was emphasised by all the speakers. The dignitaries wished for greater success and achievements of NIHSAD in control and prevention of exotic and emerging animal diseases in the country. On this occasion, the dignitaries released “Bovine Viral Diarrhoea (BVD) antibody kit” developed by team NIHSAD, for serological diagnosis of BVDV in cattle. A millet awareness campaign was launched during the celebrations and millet products were distributed to all the participants. A scientist-farmer interaction meet and animal health workshop were organized to commemorate the foundation day.



MEETINGS

Institute Research Committee (IRC) Meeting

The IRC meeting were held on 27.03.23 and 28.03.23 under the chairmanship of the Director, NIHSAD. The IRC meeting commenced with a warm welcome from Dr. Sandeep Bhatia, the In-charge of PME cell, who provided an overview of both internal and externally-funded projects. Dr. Aniket Sanyal, the chairman of IRC and Director of NIHSAD, emphasized in his opening remarks the importance of adhering to the QRT and RAC recommendations when embarking on new projects. He further emphasized that scientists should prioritize their research activities to ensure timely delivery of results. During the discussion, the chairman emphasized the critical nature of preserving the virus repository. The chairman urged the scientists to systematically maintain the virus repository by enlisting all the virus strains. Moreover, he stressed that samples received for diagnosis or collected for surveillance should be shared among scientists for screening of diseases/pathogens beyond the targeted ones. Dr. Senthil Kumar on behalf of PME extended the vote of thanks to the Director, NIHSAD, all colleagues, administrative and technical staff of NIHSAD.



The IRC (Institute Research Committee) meeting was held on 19.04.23 under the chairmanship of the Director, ICAR-NIHSAD. The IRC meeting started with welcome address by Dr. S. Nagarajan, In-

charge, PME cell. He briefed about the ongoing institute and externally funded projects. Dr. Aniket Sanyal, Chairman IRC & Director, NIHSAD, in his opening remarks, stressed to comply with the RAC recommendations and also reviewed the action taken on the recommendations of previous RAC including status paper on exotic and emerging diseases, progress towards organising brain storming session and schedule/calendar of training program for the year 2023-24. He also discussed the work progress of ASF, BVD and PRRS vaccines and emphasized on NABL ISO 17025 accreditation for African Swine Fever (ASF) and Lumpy Skin Disease (LSD) diagnostic testing.

The IRC reviewed the new project proposals were presented by the proposing scientists and the progress in various research and service projects were presented by the respective principal investigators. Four new research proposals were approved and the completion report (RPP-III) of two research projects were accepted. The progress of the ongoing research projects were found satisfactory. IRC chairman & Director, NIHSAD in his closing remark appreciated the efforts of scientists for research achievements. Dr. Pradeep Gandhale on behalf of PME extended the vote of thanks to Director, NIHSAD, all colleagues, administrative and technical staff of NIHSAD.

Institute Technology Management Committee Meeting

ITMC meeting was conducted on 29th May 2023 to consider various Institute technologies for release,



technology transfer, technology certification and IPR filing (Patent, Copyright and Trademark).

EXTENSION ACTIVITIES

Field Day and Progressive Poultry Rearing Workshop

Organized a "Field Day and Progressive Poultry Rearing Workshop" on March 10, 2023 in the village Hatiyakheda, district Raisen of Madhya Pradesh State. About 200 farmers and poultry owners have attended the workshop. Technical lectures on profitable poultry rearing, and different schemes related to Animal Husbandry Sector of the state government were delivered to the farmers. A total of 1500 poultry chicks (28- day-old) and 1.8 tonnes of poultry feed was distributed to 30 pre-identified beneficiaries of Scheduled Caste in the village Hatiyakheda under this scheme. The programme was executed and coordinated by Dr. Fateh Singh, Senior Scientist & Nodal Officer (SCSP) and Dr. Pradeep N. Gandhale, Senior Scientist & Nodal Officer (Extension).



Participation in Mahapashudhan Expo

Participated in Mahapashudhan Expo-2023 organised during March 24-26 2023 at Shirdi, Maharashtra, and technical information on emerging and exotic animal diseases in the form of printed leaflets/ folders was given to the farmers and



livestock owners who visited the institute stall. As per the published report, more than 10 lakhs farmers visited the Mahapashudhan Expo-2023 at Shirdi. Dr. P.N. Gandhale and Dr. Fateh Singh, Senior Scientists from the ICAR-NIHSAD, Bhopal have participated in the Mahapashudhan Expo-2023 at Shirdi, Maharashtra and represented the institute.

Animal Health Workshop

Organized an "Animal Health Workshop" for the farmers and livestock owners of Scheduled Caste (SC) on 23rd June 2023 at ICAR-NIHSAD, Bhopal, in which a total of 30 farmers of SC community have participated and benefitted in terms of technical information related to animal health and control and prevention of animal diseases. The workshop was planned and coordinated by Dr. Fateh Singh, Senior Scientist & Nodal Officer (SCSP) and Dr. Pradeep N. Gandhale, Senior Scientist & Nodal Officer (Extension).



**AWARDS, HONORS & RECOGNITIONS**

1. **Aniket Sanyal:** External expert – IRC, ICAR-NIVEDI ; IRC, NDVSU, Jabalpur; Annual Review meeting of NADEN at ICAR-NIVEDI; PPR-GERN meeting of ICAR-NIVEDI; TAD brainstorming meeting at DUVASU Mathura; CRPVD ARM meeting at ICAR-IVRI, Bengaluru.
2. **Naveen Kumar:** International Travel Grant by the United States Department of State, and Office of the Nonproliferation and Disarmament Fund, USA for participation in 'Applied Biorisk and Biosafety Gap Assessment Workshop' held in Baltimore, USA (February 9–10, 2023)
8. **F. Singh and P.N. Gandhale (2023).** Certificate of appreciation for active participation in State-level Exhibition Mahapashudhan Expo-2023 held during March 24-26, 2023 at Shirdi, Maharashtra.
21. **S.B. Sudhakar:** External Examiner of Laboratory-I Examination MBT-106 of M.Tech Biotechnology I Semester on 10th of April, 2023 at Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal.
22. **Naveen Kumar,** Invited as 'External Expert' for Thesis examination/Viva-Voce of M.Tech Biotechnology, at Dept. of Biological Science & Engineering, MANIT, Bhopal (13.05.2023)
3. **C. Tosh, Manoj Kumar, S. Nagarajan , S. Bhatia and H.V. Murugkar:** Technology certificate (ICAR-ASNIHSAD-Technology-2023-03) awarded by ICAR for the development of technology on “Inactivated low pathogenic avian influenza (H9N2) vaccine for chickens”
4. **K. Rajukumar, D. Senthilkumar, D.D. Kulkarni:** Technology certificate awarded by ICAR for the development of technology on “Recombinant antigen based indirect ELISA for detection of Porcine Reproductive and Respiratory Syndrome Virus antibodies in domestic pigs”
7. **F. Singh, K. Rajukumar, G. Venkatesh , D. Senthilkumar, A.K. Pateriya, A. Sanyal (2023).** Best Innovative Article Award for the paper "Transmissible gastroenteritis: a fatal swine enteric coronavirus disease" published in the journal Trends in Agriculture Sciences.
9. **A.A. Raut:** Member, Committee for Establishment of Institution like AIIMS in Veterinary Sciences, Veterinary Council of India.
10. **A.A. Raut:** Member, Task Force, Strategy of Boosting Bio-Economy of MP, MP state policy & planning commission.
11. **A.A. Raut:** Expert Member, ICMR-DBT Joint Group on Drafting of Guidelines for Establishment of BSL3 Laboratories' ICMR, MoHFW, GOI.
12. **A.A. Raut:** Expert Member, BSL Network Mock Drill SOP development working group', ICMR, MoHFW, GOI
13. **A.A. Raut:** Member, BSL4 Expert Committee, Microbial Containment Complex, ICMR-National Institute of Virology, Pune
14. **A.A. Raut:** Domain Expert, Biobanking and ISO: 20387: 2018 Standards, NABL, Quality control of India.
16. **P.N. Gandhale:** Evaluator for MVSc (Vet. Microbiology) thesis titled “Detection and Molecular Characterization of Canine Astrovirus From Dogs” of Kamdhenu University, Gujarat

18. **Manoj Kumar:** Co-opted Member of the Expert Committee-Life Sciences on Start-up Research Grant & Post Doctoral Fellowship Schemes by Science & Engineering Research Board, Department of Science and Technology, GoI.

19. **P.N. Gandhale:** Member, expert team for Sector Connect: Field Epidemiology Programme in One Health (FEP-OH), a multisectoral 3-month on-the-job training for in-service candidates from health related sectors jointly organized by the National Centre for Disease Control (NCDC) and the Department of Animal Husbandry and Dairying (DAHD), Government of India.

CAPACITY BUILDING

Training Support for Transfer of Technology “Inactivated Low Pathogenic Avian Influenza (H9N2) Vaccine for Chickens

A training programme was conducted for four licensees viz. M/s. Globion Pvt. Ltd., India, M/s. Venkateshwara Hatcheries Pvt. Ltd., India, M/s. Indovax Pvt. Ltd., India, M/s. Hester Biosciences Ltd., India for training support and handholding for

transfer of technology “Inactivated Low Pathogenic Avian Influenza (H9N2) Vaccine for Chickens” from 16th-20th Jan., 2023. A total of 9 personnel participated in the training program. The candidate vaccine strain and relevant technical information pertaining to the technology were transferred as per the terms and conditions of the TOT and TLA at the end of the training programme.





Training on Laboratory Biosafety and Biosecurity 30th Jan to 3rd Feb, 2023

A training programme on Laboratory Biosafety and Biosecurity was organized from 30.01.2023 to 03.02.2023. The objective of the training programmed was to provide the stakeholders with an insight to the practical biosafety related issues in their work areas and provide them with some basic

tools to handle these pathogens in a safe environment to ensure both personal and environmental safety from all the dangerous infectious pathogens being handled by them. A total of 12 participants from Medical, veterinary diagnostic laboratories and institutions along with professionals from private biosafety industries participated in the programme.



PERSONNEL

JOINING

- ◆ Shri Ashish Chobey, Administrative Officer has been joined to ICAR-NIHSAD, Bhopal on 03.04.2023.

TRANSFERS

- ◆ Shri P.S. Sunil Kumar, Administrative Officer has been transferred to IISS, Bhopal on 31.03.2023.



RETIREMENTS

- ◆ Shri B.C. Kandpal, Asst. Admin. Officer, has retired on 30.06.2023.





Published by
DIRECTOR

ICAR-NATIONAL INSTITUTE OF HIGH SECURITY ANIMAL DISEASES

Anand Nagar, Bhopal – 462022 Madhya Pradesh, India

Ph: +91-755-2759204, Fax: +91-755-2758842

Email: director.nihsad@icar.gov.in

Website: www.nihsad.nic.in