ANIMAL DISEASE SURVEILLANCE AND CONTROL IN INDIA WITH REFERENCE TO EMERGING/EXOTIC DISEASES

By

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India has a fast growing livestock sector and it is taking steps to achieve self-sufficiency in production of animal products. India ranks first in the world in production of milk, seventh in production of egg and eighth in export of meat. It is projected that by 2020 meat, egg and milk production will increase by 50%, 35% and 25%, respectively.

Effective measures to guarantee animal health through exclusion and/or containment of emerging as well as trans-boundary or exotic animal diseases is a prerequisite for sustained livestock production. There is a growing threat of use of biological agents by terrorists to deliberately cause animal diseases in order to destroy animal wealth and to cripple the economy of a country. In a conducive environment organisms used in biological weapons can multiply and self-perpetuate and in course of time they may naturally mutate and frustrate currently available protective measures.

EMERGING DISEASES

There have been several outbreaks of new and emerging diseases like Bovine Spongyform Encephalopathy (BSE), Paramyxovirus infection in horses (Hendra) and pigs (Nipah) and Zoonotic H5N1 avian influenza. Fortunately, India has remained free from these diseases. Also, old diseases re-emerge in new guises that enable them to evade current control measures. These agents might have undergone subtle genetic changes or could be recombinants with other viral or cellular genes. Immunological pressure could also be responsible for such genetic changes. These organisms may also turn out to be really new, hitherto undiscovered agents. Of particular concern is the ability of new multi-drug resistant bacteria with a pathogenic potential for human via food chain like Salmonella enterica, Campylobacter, Enterococcus spp etc. The recent reports of H5N1 avian influenza virus crossing the species barriers and infecting humans, pigs, cats and tigers have caused alarming situation world-wide. This is especially true for pigs that have strong genetic similarity to humans.

EXOTIC DISEASES

There has been always a risk of introduction of new diseases/pathogenic organisms into a country causing serious animal health problems in terms of mortality and morbidity. Exotic (non native) pathogens, once introduced into a country, can escalate into an epidemic due to the absence of vaccine or effective drugs, lack of resistance in host animals and limited resources to diagnose and restrict the spread of these pathogens. Hence, there is a need to take extra precaution in import of animals infected with such pathogens. The WTO has permitted countries to exercise their sovereign rights to protect their livestock industry from such diseases.
Laboratory facilities: In India, facilities are available to diagnose and control existing animal diseases. Apart from laboratories at the state and district levels, there are referral diagnostic facilities including national and regional laboratories with advanced technologies. In 1998, a containment laboratory of Bio-safety Level-4 (BSL-4) High Security Animal Disease Laboratory (HSADL) has been established with state-of-the-art facilities at Bhopal. This is one of the ten such containment laboratories in the world. It is safe for handling high risk (risk group-IV) and exotic animal pathogens. And, it has been authorized by the Government to diagnose and suggest suitable control measures for exotic and emerging animal diseases, which might gain entry into the country through international borders.

Research and Diagnostic Capabilities: In India, technology is available to diagnose and control existing animal diseases. The High Security Animal Disease Laboratory at Bhopal is involved in diagnosis and control of exotic and emerging animal diseases. It is well equipped for research and diagnosis of diseases using conventional and latest molecular biological techniques. The scientific manpower is well trained and adequate.

In India, technology has been developed for diagnosis of exotic diseases using OIE recommended tests and latest molecular techniques like PCR, gene cloning and sequencing. Facilities are also available for monoclonal antibody production against various exotic animal pathogens. Presently projects are being undertaken for research and diagnosis of avian influenza, rabbit hemorrhagic disease, Bovine viral diarrhea, Bovine immuno-deficiency, Aujeszky’s disease, porcine reproductive and respiratory syndrome, transmissible gastroenteritis, African swine fever, malignant Catarrhal fever, caprine arthritis and encephalitis. While undertaking surveillance on these diseases, Aujeszky’s disease, bovine immunodeficiency and malignant Catarrhal fever have been diagnosed by serology, PCR and gene sequencing. These diseases are yet to be confirmed by isolation of the etiological agents. Base line data generated over the last five years have indicated the absence of highly pathogenic avian influenza, rabbit haemorrhagic disease, porcine reproductive and respiratory syndrome, transmissible gastroenteritis and African Swine fever. In addition, the laboratory has developed recombinant antigen and monoclonal antibody based competitive ELISA kits for diagnosis of bovine viral diarrhoea and bovine immuno-deficiency. The later is the first diagnostic kit of its kind in the world.

In 2001, the High Security Animal Disease Laboratory diagnosed highly pathogenic avian influenza (H7) in imported pigeons which were destroyed immediately and the entry of this disease to India could be prevented. Since then surveillance work on avian influenza has been carried out all over the country and
more than thousand birds from different parts of the country including western and eastern states have been tested so far. In spite of the fact that several Asian countries are affected with H5N1 subtype of the virus, also pathogenic to humans, no case has been detected in India. India has so far remained free from highly pathogenic avian influenza because of the prompt action taken by the Government through the ban imposed on import of poultry, poultry products and biologicals. Besides, international borders were sealed and strict surveillance was carried out in states adjoining international borders. The High Security Animal Disease Laboratory played a vital role in preventing the entry of this disease to the country. The laboratory is well equipped for diagnosis of avian influenza using OIE recommended tests including pathogenicity test and sub-typing of the virus. Facilities are also available for sequencing of the viral genomes.

In 2001, rabbits imported into the country for breeding program were diagnosed for rabbit hemorrhagic disease and their destruction during the quarantine period saved the country from the ingress of this disease.

FUTURE STRATEGIES

The future progress in animal disease diagnosis depends largely on the development of more accurate laboratory tests. The enormous progress in biomedical science including that of biotechnology during the last two decades made the development of novel tests possible. However, harmonization of test methodologies is necessary for uniformity in diagnosis and subsequent control measures.

India is developing diagnostic technologies for most of the exotic diseases, which might pose a threat. Steps are also being taken to disseminate technology in advance areas of disease diagnosis and control for the benefit of the animal industry. The appearance of a potentially disastrous animal disease or even suspicion of the existence of such a disease is considered as a disease emergency and India is in a position to handle such emergencies. Organizational structures to enact statutes and provide directives necessary to contain such situations has been a priority of the Government. The country is committed to establish a comprehensive national campaign for diagnosis and control of emergency diseases similar to that developed for the control of Rinder Pest, Foot and Mouth disease and Avian Influenza.

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