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Importance of biostatistics in disease surveillance of aquatic animals in India

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Consistent, defensible and scientifically sound assessments of disease threats and freedom are needed to fulfill the requirement of the agreement on the Application of Sanitary and Phytosanitary (SPS) agreement of the World Trade Organization (WTO). As part of the consequence, epidemiological and economic modelings are needed to assess disease spread and impact on local industries and wild populations. More broadly, an assessment of routes of introduction through trade is the necessary basis, on which country's biosecurity measures can be reviewed. Measurement of disease frequency in time and space and in different population is a part of epidemiological research. More recently molecular analyses have been incorporated into outbreak investigations in order to aid source tracking. Monitoring and surveillance for aquatic animal diseases are undertaken by governments to demonstrate disease freedom or progress in disease control. The OIE listed diseases (EUS, WSV, KHV, SVC, VHS, IHN, AHPND, TSV, and Gyrodactylosis) and diseases of Indian national concern (Edwardseillosis, Vibriosis, Saprolegniasis, MAS, Myxoboliasis, Argulosis, Lernaeasis, MBV and Soft Shell Syndrome etc.) are actively considered under this surveillance programme. Understanding the routes of disease spread is of key importance to containment and control. Consequently, epidemiological studies have made a significant contribution to the health of both wild and farmed aquatic animals, through improved biosecurity and surveillance of exotic diseases and control of endemic diseases. To meet the international obligation, the Department of Animal Husbandry Dairying and Fisheries (DAHDF), Ministry of Agriculture, Government of India has approved a National Project on aquatic animal disease surveillance for five years and funding of INR 320 million (about US$ six million) has been allocated through the National Fisheries Development Board (NFDB). A national consultation on aquatic animal disease surveillance held in April 2012, attended by NACA, made a strong recommendation for the need of a National Programme on disease surveillance. Accordingly the National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) in India took its skeletal shape in 2013 as a mission mode project with NBFGR as the nodal coordinating agency. At the initial stage 21 leading National Institutions in close collaboration with respective state fisheries departments covering 14 key Indian states with passive and active surveillance in more than 100 districts were under the surveillance screen. There after these leading institutions numbers hiked up to 26 by 2016. The data collected approximately from 1000 different farms were put into different type of tests for its validity and confirmation through stastical means. The base line data information, biological sample collection (Finfish, Crustaceans and Molluscs) and disease outbreaks (Finfish Crustaceans and Molluscs) were put in web link to develop a strong disease surveillance programme.

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Screening node attributes that significantly influence node centrality in the network

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In the present study, I proposed a method to screen node attributes that significantly influencing node centrality in the network. One of four node centralities are degree centrality, closeness centrality, betweenness centrality and circuit centrality, can be used as the dependent variable and attribute-by-node data are used as the data of independent variables. Stepwise linear regression method was applied to screen statistically significant node attributes from candidate attributes. Matlab codes of the algorithm are provided.

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