Screening of elephants (*Elephas maximus*) for Foot and Mouth Disease Virus antibodies by liquid phase block ELISA

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A total of thirty seven serum samples were collected from wild and captive elephants at Shri Chamarajendra zoological gardens, Mysooru, Sakkarebailu elephant camp, Shivamogga, Bandipur and Nagarahole National Park, during 2007. The elephants, eighteen numbers at Shri Chamarajendra zoological gardens, Mysooru and Sakkarebailu elephant camp, Shivamogga, were vaccinated with commercially available trivalent FMD vaccine from Indian Immunologicals and Intervet.

As there is no prescribed dose or schedule of vaccination in elephant or other wild animals, these animals were vaccinated with 6 ml of the vaccine and calves were vaccinated with 4 ml of the vaccine. No boosters were given but the vaccination was repeated every six months. Serum was collected from these animals after twenty one days post vaccination. Whereas, there was no history of vaccination in elephants maintained at Bandipur and Nagarahole National Park. Serum was collected from nineteen animals from this place which were not vaccinated to make a comparative study. The serum samples so collected were subjected to liquid phase block ELISA (LPB-ELISA). In brief, a series of two fold dilutions of the test serum were mixed with an equal volume of a fixed predetermined dose of virus in a low binding plate and allowed to react overnight at 4^0 C. Next day the free antigen are trapped to the wells of the ELISA plates by pre specific rabbit antibodies.

Subsequently the presence of antigen was traced by adding pre titrated guinea pig serum and anti guinea pig HRP conjugate. Rest of the procedure was similar to standard ELISA procedure. Substrate reaction was stopped and the plate was read at 492 nm. The titer of the serum sample was calculated as the reciprocal of the highest dilution showing 50 percent inhibition of OD value as compared to the antigen control wells. Since there is no published information or literature on protective titers in elephants, serum samples showing a titer of 1:64 ($\log_{10}$1.8) were considered as protective antibody titers against FMD virus type as in domestic animals.

The results of the present study are presented in Table 1.

Status	Total number	Antibody titer > 1.8		
		O	A	Asia 1
Vaccinated	18	14	18	18
Unvaccinated	19	0	4	0

Table 1. Antibody titer (log10) against different FMD serotypes in the serum samples of vaccinated and unvaccinated elephants.

As per PD-FMD (Project Directorate on Foot and Mouth Disease), a titer of $\log_{10}$1.8 and above are considered protective in FMD vaccinated domestic animals. The same titer was considered to be protective in elephants in our study as there is no vaccination followed in wild animals. Of the eighteen animals vaccinated fourteen animals showed a titer of >1.8 against serotype O and all eighteen animals had a titer of >1.8 against both A and Asia 1 serotype. Thus, results indicate that there was a seroconversion in the vaccinated elephants both at Shri Chamarajendra zoological gardens, Mysooru and Sakkarebailu elephant camp, Shivamogga. All these animals showed hundred per cent protection against serotype A and Asia-1 and 83.33 per cent seroconversion was seen against serotype O vaccination with monovalent O type vaccine may help in improving the titer against serotype O. The animals, nineteen numbers at Bandipur and Nagarahole National Park which had no history of vaccination did not show the protective response against O and Asia 1. But four animals showed a titer of >1.8 against serotype A whereas rest fifteen animals were having a titer of <1.8 which means that the elephants had an exposure to the virus in the field. From the study it is evident that there was seroconversion in vaccinated animals. Since there is only meager information available on this, further studies may help in making a conclusion. Vaccinating the animals to maintain immunity and to prevent the disease is worthwile.

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