

# PERSISTENCE OF PATHOGENIC FOR MAN HANTAVIRUSES IN APODEMUS MICE POPULATIONS

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## INTRODUCTION

*Apodemus peninsulae* and *A. agrarius* are the natural hosts of *Amur* (AMRV) and *Hantaan-g/v FE* (HTNV) hantaviruses (сeм. *Bunyaviridae*, род *Hantavirus*) that may cause Hemorrhagic fever with renal syndrome (HFRS) to human.



There is a strong temporal correlation between number of infected *A. peninsulae* and *A. agrarius* and HFRS cases.

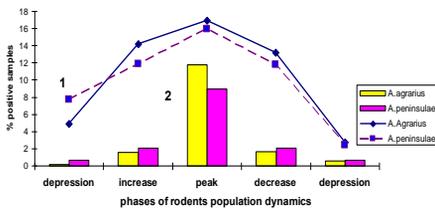
## AIMS

Complex monitoring of dynamics of epizootic and epidemic processes on HFRS endemic areas in Primorye Region of Far East Russia with the purpose of evaluation persistence of *Hantaan* (genovariant FE) and *Amur* hantaviruses and detection of periods of acute infection in their rodent-reservoir populations – *Apodemus agrarius* and *A. peninsulae* accordingly – were performed.

## MATERIAL AND METHODS

Epizootological monitoring was carried out in the forest-steppe landscape favourable for *A. agrarius* and in the cedar-oak forests optimum for *A. peninsulae* (2001-2013). Criteria of acute infection were detection of viral antigen/RNA in the lungs and organs of secretion/excretion and low avidity antibody in blood of rodents using ELISA, RT-PCR and IFA. Cases of HFRS diseases were summed in every epidemic season.

Detection of hantaviral antigen in lungs and eliminative organs of mice genus *Apodemus* during different phases of rodent population dynamic



1 - hantaviral antigen in lungs (line) 2 - hantaviral antigen in eliminative organs (bar)

## RESULTS

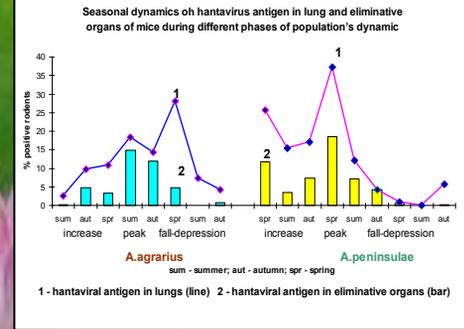
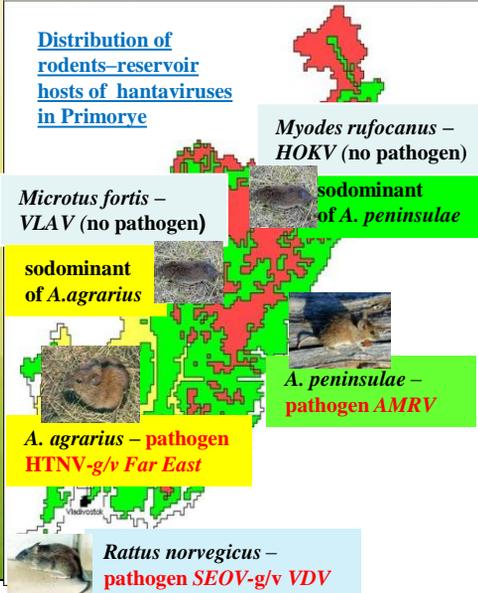
The hantavirus antigen/RNA in eliminative organs were detected of 2.0% *A. agrarius* and 1.6% *A. peninsulae* in period of **increase** of epizootic activity and 11.8% and 9.6% respectively during of **high** epizootic activity. Period of **low** epizootic activity in different *Apodemus* mice populations was associated with 0.2% *A. agrarius* and 0.7% *A. peninsulae* with acute infection. **In year of high activity of epizootic process** seasonal dynamic of hantaviral infection in *A. agrarius* populations was characterized by increase of infected mice from spring (3.5%) to autumn (13.4%) and on the contrary by decrease in *A. peninsulae* populations (18.1% and 4.0% respectively). Animals with hantaviral antigen in eliminative organs were mainly at 3-5 months old and 67.4% from them had low avidity IgG antibodies. **Annual variations of epidemic activity** of different HFRS natural foci directly correlated with numbers of carriers of acute hantaviral infection in *A. agrarius* and *A. peninsulae* populations.

## CONCLUSION

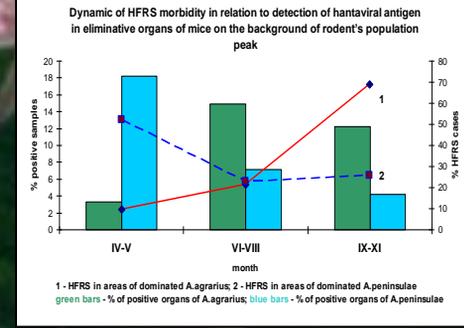
Outbreaks of HFRS on Primorye Territory were observed at the same year of high epizootic activity in *Hantaan*(FE)- or *Amur*- hantaviral infection natural foci. Thereby we can conclude that periods of acute infection in *Apodemus* mice populations cause increase of HFRS morbidity.

The approach to an assessment of activity epizootic process, in view of dynamics of acute infection in populations of natural hosts pathogenic hantaviruses, allows to predict seasons of epidemic trouble and the raised risk of infection of people and optimum timeframes of carrying out against-endemic actions in different landscape zones.

## Distribution of rodents-reservoir hosts of hantaviruses in Primorye



1 - hantaviral antigen in lungs (line) 2 - hantaviral antigen in eliminative organs (bar)



1 - HFRS in areas of dominated *A. agrarius*; 2 - HFRS in areas of dominated *A. peninsulae*  
 green bars - % of positive organs of *A. agrarius*; blue bars - % of positive organs of *A. peninsulae*



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