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BASIS FOR COMBINED NATURAL FOCI OF TICK-BORNE INFECTIONS IN ROSTOV REGION

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Over the last decade the scope of research on ecological, epizootological and epidemiological aspects of natural focal diseases has extended into the study of combined natural focality as a new direction of fundamental and applied science.

Examples of mixed natural foci of infectious diseases are large in number – of tick-borne viral encephalitis, ixodic tick-borne borreliosis, Crimean haemorrhagic fever, Q fever, human monocytic ehrlichiosis and granulocytic anaplasmosis [1, 2, 3]. The existence of combined natural foci is “the rule rather than the exception”.

The landscape-biocenological concept of a combination of natural foci of diseases by A.V. Ushakov [4] makes it possible to consider the combination of infections’ foci, their interactions at the level of populations of pathogens, vectors and hosts. The basis for combination appears only in case of interaction between pairs of identical factors, for example, such as two parasitic systems, host vulnerability to two agents and others.

In Rostov region the natural foci of Crimean haemorrhagic fever, ixodic tick-borne borreliosis and Q fever have been identified. Their geographic areas coincide. The spread of pathogens causing tick-borne viral encephalitis and human monocytic ehrlichiosis is explored at the moment.

As revealed by the analysis of parasitic systems of the above infections, they include the same key vectors and reservoir hosts of pathogens. It has been established that the dominant type of ixodic ticks is *Dermacentor marginatus* - vector of viruses of Crimean-Congo hemorrhagic fever and tick-borne viral encephalitis, and the pathogen of ixodic tick-borne borreliosis - *Borrellia burgdorferi s.l.* of biotype *B.afzelii*, the pathogen of Q fever - *Coxiella burnetii* and the pathogen of human

monocytic ehrlichiosis - *Ehrlichia spp.; Rhipicephalus rossicus* – viruses of tick-borne encephalitis and Crimean-Congo hemorrhagic fever, *B.afzelii, Ehrlichia spp.* and *Ixodes ricinus* - virus of Crimean-Congo hemorrhagic fever, *B.afzelii, C.burnetii*. Reservoir hosts of the pathogens are common species of mouse-like rodents - *Mus musculus* (viruses of tick-borne encephalitis+Crimean-Congo hemorrhagic fever+*B.afzelii+C.burnetii+Ehrlichia spp.*) and Apodemus sylvaticus (virus of Crimean-Congo hemorrhagic fever+*C.burnetii+B.afzelii+Ehrlichia spp*.), *Microtus arvalis* (viruses of tick-borne encephalitis+Crimean-Congo hemorrhagic fever+*B.afzelii+C.burnetii+Ehrlichia spp*.). That's how the systematically combined foci of the following infections appear: tick-borne encephalitis - Crimean hemorrhagic fever - Q fever - ixodic tick-borne borreliosis - human monocytic ehrlichiosis; Crimean hemorrhagic fever - Q fever - ixodic tick-borne borreliosis - human monocytic ehrlichiosis.

The foci of these infections interact at the level of parasite cenosis of interacting subpopulations of pathogens and populations of mouse-like rodents (*Mus musculus* and *Apodemus sylvaticus*) and *Microtus arvalis*, on the one hand, and at the level of parasite cenosis of interacting subpopulations of pathogens and population of ixodic ticks (*D. marginatus, I. ricinus, R. rossicus*), on the other hand. As a result the combination of foci occurs at the level of interacting populations of pathogens, vectors and their hosts, determining the focality as systematically combined, the combination type - as viral-bacterial and degree of combination - as the polymorphic two-host (populations of Muridae and Cricetidae families). As parasitic systems at the level of mammals' populations - shared reservoir hosts - are represented not by one, but by three different families, such natural foci can be described as two-host population-combined, and the foci concerned as two-host population-combined natural foci of tick-borne encephalitis - Crimean hemorrhagic fever - Q fever - ixodic tick-borne borreliosis - human monocytic ehrlichiosis; Crimean hemorrhagic fever - Q fever - ixodic tick-borne borreliosis - human monocytic ehrlichiosis.

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