BOOK REVIEWS. КРИТИКА И БИБЛИОГРАФИЯ

Tick - Tick-Borne Pathogen System and its Emergent Qualities. By A.N.Alekseev. Zoological Institute, Russian Academy of Science. 1993. 203 pp.

The monograph is devoted to consideration and summarization of the data that have been accumulated so far on ticks, tick-borne pathogens, their interactions with the environment, and types of host-parasite relationships. Undoubtedly new is the systemic approach to designing these problems, where tick -tick-borne pathogen relationships are considered a specific system with some emergent qualities.

The monograph consist of seven chapters. The first chapter is concerned with morphological and physiological peculiarities of ticks which predetermine types of ticks -tick-borne pathogen relationships. Mechanisms of sticking and fastening on hosts, which are essential for the transmission of pathogens, and the salivary glands structure and functions and their connection with reproduction of pathogens are discussed in detail. Salivary glands are viewed as the place of not only pathogen accumulation and passing a part of the life-cycle of viruses, rickettsiae, and piroplasmidae, but also forming the mechanisms providing for the successful transmission of pathogens to vertebrate hosts. Based on his own experiments, the author shows that ticks infected with the tick-borne encephalitis (TBE) virus lose less water and need less energy for the restoration of water balance in comparison with noninfected ones.

The cement plug of ticks in the animal host skin is considered as a virus depot for the first time. Discussed in the same chapter are the process of pathogen acceptance, the ingestion system as the first line of tick defence, and haemocyte reaction on pathogens. The author shows that staphylococci and salmonellae cause a strong phagocytic reaction in tides. The tick's protective mechanisms are considered by the author as a bivalent system which, on the one hand, blocks up the pathogens nonadapted to the ticks and promote obligatorily transmissive pathogens, on the other hand. Microorganisms, that have overcome the gut barrier use the haemocytes as not only a place for their reproduction, but also

a means of transporting themselves inside the tick body to the most favorable tissue.

The second chapter deals with the transphasic transmission of pathogens and its' types. The author discusses all possible types of exchange of all known pathogens, in the ticks infected with only one pathogen and a mixture of different pathogens. Special attention is paid to the influence of pathogens on the tick organism.

In this connection, the 3-d chapter dealing with ticks' behavior is most interesting. On the basis of his own experiments, the author demonstrates that different species of ticks react to the odor of plants differently and their selection of plants is not accidental.

The attractive influence of the odor of particular plants contributes to the engorged ticks' falling from hosts in appropriate biotopes and helps both sexes to find each other, both in Ixodinae mating on plants before feeding and in Amblyomminae because this quarantees synchronous getting to one host.

The behavior of the tick-vector changes in response to pathogen influence. More typical of the infected ticks is the negative geotaxis and the less expressed hygrotaxis. Movement of the infected ticks is more intensive, as well as the response to the odor of a potential host. Infected ticks' response to the odor of plants can also change, and the more virions there are in a tick, the strionger is the change.

The experiments with nymphs of *Dermacentor marginatus* showed that infection by TBE virus influences the parameters of nutrition. Among the infected nymphs, the percentage of engorged ones decreases, and the weight of imagos developed from the infected nymphs is also lower than normal. The presence of plant odors smooth down the negative influence of the virus.

I regret to have to note that some experiments by the author are not enough accurate. In some of them, the number of ticks used was too small, and statistically some results may be within the range of standard error.

Chapter 4 is devoted to the importance of sympatry of tick populations for the pathogen exchange and for the maintenance of the foci of transmissive infections. In this chapter, the author formulates the major "emergent" qualities of the tick - tick-borne-pathogen system: greater virulence for vertebrates - greater neurotropism in vector; greater influence upon the tick nervous system - greater changes in behavior and stronger reactions to the external stimuli; changed behavior - the

increased probability of genofond mixing in ticks and pathogens; changed behavior of the infected part of tick population - more probable exchange of pathogens.

In chapter 5, the "emergent" qualities of the tick - group of symbionts system, are discussed, as well as the mechanisms of interaction between the components of the tick - pathogen system.

Chapter 6 is a summarization of data on interaction of ticks and pathogens. It is shown that tick - pathogen systems can be more or less complex and have different emergent qualities depending on the type of pathogens (bacteria, rickettsiae, piroplasmidae, borreliae, and helminths).

As an example of a very complex system having many emergent qualities, the tick - TBE system is discussed (chapter 7).

The book has many schemes, graphs, and figures. The author summarizes all of the recent literature on this problem, using the newest data.

Finally, I have to express my regret that the monograph can remain unaccessible for our foreign colleagues because of the linguistic barrier. What can only be recommended is an organisation of translating the book and preparating an English edition by some Western publishing house.

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