

Hybridized mosquitos advance malaria research

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Credit: CDC

In December 2016, the *American Journal of Vector Ecology* published two articles by Yuri Novikov, a scientist at the TSU Biological Institute devoted to the ecology, distribution and laboratory cultivation of maculipennis complex, a species of malaria mosquito. Hybridization has advanced the study of malaria mosquitoes, allowing more accurate investigation of their physiology and their ability to transfer malaria

plasmodium.

"The article presents the results of developing a method of cultivating *Anopheles beklemishevi* in the laboratory, which helps us to solve two problems at once," says Novikov. "First, by growing mosquitoes, we can work with them year-round instead of seasonally. Second, as a result of laboratory cultivation, we get virgin females, without which the hybridization process is not possible."

For the first time, the researchers hybridized the *Anopheles beklemishevi* species, discovered and described by TSU geneticists 40 years ago, with *Anopheles atroparvus*. This cannot occur under natural conditions. The study of hybrids provides an opportunity to assess the degree of reproductive compatibility of species, which is an important feature in reconstructing the evolution of this group of related species. Experiments in the laboratory will allow predicting the likely composition of the species of mosquitoes and the epidemiological situation in Siberia due to the rapidly changing climate.

In the course of a detailed study and comparative analysis of 8,000 specimens collected from 34 Russian and Kazakhstan areas, it was determined that the habitat of species *Anopheles beklemishevi* is much wider than expected: It spread from Estonia to Yakutia and from the Arctic to the Altai and Sayan. The relative population of the species is low everywhere; in the south of Western Siberia and Altai, the frequency has been steadily reduced. So in the vicinity of Tomsk (Kolarovo), the proportion of *Anopheles beklemishevi* among malaria mosquitoes has dropped from 25 percent in 1976 to 3.2 percent now.

According to the scientist, the discovery of representatives of this type in Yakutia is an indirect confirmation of the idea that malaria mosquitoes of the *maculipennis* complex came to Eurasia from America through the Bering Land Bridge. Novikov's studies show that as a result of climate

change, there is an expansion of the area of the southwestern [species](#) of mosquitoes. They are moving northeast, conquering a new environment successfully, and breeding in areas where they previously could not survive.

More information: Yuri M. Novikov, On the ecology and range of (Diptera: Culicidae) with reference to the taxonomy of, *Journal of Vector Ecology* (2016). [DOI: 10.1111/jvec.12215](https://doi.org/10.1111/jvec.12215)

Provided by Tomsk State University

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