

***Wolbachia* and mtDNA diversity and distribution in palearctic *Drosophila melanogaster* populations**

R. Bykov^{1*}, I. Mazunin², M. Yudina^{1,3}, Yu. Ilinsky^{1,2,3}

¹ *Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*

² *Immanuel Kant Baltic Federal University, Kaliningrad, Russia*

³ *Novosibirsk State University, Novosibirsk, Russia*

* e-mail: bykovra@bonet.nsc.ru

Key words: *Wolbachia*, *Drosophila melanogaster*, mtDNA

Motivation and Aim: *Wolbachia* symbionts are found in *Drosophila melanogaster* populations all over the world [1, 2]. Genetic diversity of the symbiont in *D. melanogaster* is subdivided into several clades that have strong association with certain host mtDNA clades [3, 4]. Here we represent results of comprehensive surveys on cytoplasmic inheritance (*Wolbachia* and mtDNA) of fruit fly populations in a vast Palearctic territory. We address to the symbiont prevalence and symbiont genetic pattern as well as mtDNA pattern.

Methods and Algorithms: In total 1550 *D. melanogaster* samples were collected from different Palearctic localities. Samples were screened by PCR for *Wolbachia* infection and mitochondrial haplotypes.

Results: *Wolbachia* infection was found in every studied *D. melanogaster* populations from Western Europe to Far East. The average rate of infection was 0.56 (95 % confidence interval, 0.54–0.59). Infection rates are not dependent on longitude or latitude. Five mtDNA clades were found, where two of them (III and V clades) were predominant, that confirmed with previous data: the III clade is widely distributed in the world while the V clade is found only in Palearctic region.

Conclusion: We demonstrate wide *Wolbachia* distribution in Palearctic *D. melanogaster* populations. According to our data on symbiont diversity and distribution the fly populations of many regions in temperate zone renew after cold season. High frequency of the V clade of mtDNA in Palearctic populations may be explained by it having originated in this region.

Acknowledgements: Supported by the RFBR (16-04-00980).

References

1. Solignac M. et al. (1994) Widespread occurrence of the proteobacteria *Wolbachia* and partial cytoplasmic incompatibility in *Drosophila melanogaster*. *Comptes rendus de l'Académie des sciences. Série 3. Sciences Vie.* 317(5):461-470.
2. Riegler M. et al. (2005) Evidence for a global *Wolbachia* replacement in *Drosophila melanogaster*. *Current Biology.* 15(15):1428-1433.
3. Richardson M.F. et al. (2012) Population genomics of the *Wolbachia* endosymbiont in *Drosophila melanogaster*. *PLoS Genetics.* 8(12):e1003129.
4. Ilinsky Yu. (2013) Coevolution of *Drosophila melanogaster* mtDNA and *Wolbachia* genotypes. *PLoS One.* 8(1):e54373.