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Burzyan Population of the Dark Forest Honey Bee *Apis mellifera mellifera*

Rustem A. Ilyasov*

Vavilov Institute of General Genetics of Russian Academy of Sciences, Moscow, Russia

***Corresponding Author:** Rustem A. Ilyasov, Vavilov Institute of General Genetics of Russian Academy of Sciences, Moscow, Russia, E-Mail: apismell@hotmail.com*

INTRODUCTION

The European honey bee *Apis mellifera* is important for humans and the environment as a pollinator for agricultural and wild plants [1]. The number of honey bee colonies has declined annually in recent decades [2, 3] due to a variety of factors, including climate change, habitat loss, pesticide use, the spread of pests and pathogens, and hybridization with introduced southern subspecies, such as *Apis mellifera ligustica*, *Apis mellifera caucasia*, and *Apis mellifera carpathica* [4-6]. Due to its extensive distribution area in a wide range of climatic and ecological zones, *A. mellifera* is currently subdivided into 30 subspecies, as well as dozens of ecotypes [7-9]. The gene pool of bee populations plays an important role in adaptation, therefore maintaining the gene pool is a prerequisite for maintaining efficient and sustainable beekeeping [9].

The honey bee subspecies *Apis mellifera mellifera* has the most northern distribution and is adapted to living in a sharply continental climate and is of value for the countries of Northern and Western Europe and Russia [9-11]. Recently, among other local populations of honey bees, the Burzyan population of the dark forest bee is considered the most preserved and isolated due to its location in the remote mountain-forest zone of the Southern Urals. The popularity of the Burzyan population of the dark forest bee is provided by the following factors. Firstly, colonies of honey bees of the Burzyan population live not only in semi-domestic conditions in artificial tree hollows but also in the wild in natural tree hollows without human assistance. In the course of evolution, over more than 1000 years of isolation in the South Urals, the honey bees of the Burzyan population acquired such characteristics as increased winter hardiness, aggressiveness against bears and other animals, a relatively large colony size that allows keeping the temperature in the family in winter, increased resistance to diseases and parasites [12]. Secondly, the honey bees of the Burzyan population are well adapted to the rapid collection of honey from the linden tree *Tilia cordata*, which blooms for only one week per year. In the Republic of Bashkortostan, the linden tree and the honey bees of the Burzyan population have mutual co-evolution, as a result of which they acquired a unique co-adaptation to each other [12, 13].

The South Urals and the Republic of Bashkortostan is the region of residence of the local indigenous people - Bashkirs, which historically formed in the Altai. The Republic of Bashkortostan is widely known in the world for the production of unique Bashkir linden honey as a result of the traditional beekeeping of the local indigenous inhabitants of Bashkirs. The preservation of the Burzyan honey bee population means the simultaneous preservation of the ancient traditional beekeeping in the hollows of trees. To preserve the Burzyan population of the dark forest bee, the "Shulgan-Tash" and "Bashkiria" reserves were created in 1986, the "Altyn Solok" reserve - in 1997, the "Bashkirsky Ural" UNESCO reserve - in 2012 [11]. At present, in the Republic of Bashkortostan, hybridization of local honey bees with southern subspecies of honey bees is estimated at 10%, but the Burzyan population of the dark forest bee is protected from hybridization in the Shulgan-Tash reserve, where they are isolated and are under a strict regime of protection and a ban on keeping any agricultural activity [13]. It is recognized that the Burzyan population of the dark forest bee has a unique naturally preserved gene pool of *A. m. mellifera*, which can be used as a reference genome for comparison, as well as to maintain the genetic diversity of other local populations of the dark forest bees [9, 12-14].

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