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RACE COMPOSITION OF BEES IN UZBEKISTAN

Suyarkulov Sherali Rustambekovich

Senior lecturer of Fergana State University, Candidate of Agricultural Sciences

Jamolov Rapikjon Kushmatovich

Senior teacher of Fergana State University

Azizov Rahmatillo Olimjon ugli

Student of Fergana State University

Abstract: The article describes the natural and climatic conditions of different zones of Uzbekistan and honey-producing plants, the breed of bees, their breeding, and their morphological characteristics.

Key words: Bees, race, Carpathian, Carnica, reproduction, expertise, genetic, export, morphological.

Introduction. To determine the race composition of bees of the Republic, it is necessary to return to the history of beekeeping in this area. It is known that the first bees were brought from the south of Russia at the end of the 19th century and they were representatives of the Central Russian race of honey bees. At the beginning of the 20th century, a large number of bees were brought from the Caucasus. At that time, Central Asia did not have its own bees. There is no documentary evidence of the presence of the Turan race of bees in this region. In the 70s of the last century, during the creation of more than 80 bee farms in the republic, Carpathian and gray North Caucasian bees were imported in large quantities and they served as the basis for these farms.

Research object. Bee families, sources of honey and bee products in the population, entrepreneurs and farms.

Research results. Taking into account the priority of reproduction in beekeeping, a batch of Italian queen bees was brought and they were widely distributed throughout Uzbekistan. We helped to create a population of bees characterized by the rapid and early development of bees in the spring, the rapid growth of the family, which fully met the requirements of package beekeeping. The honey production of these bees was not very high, the bees used all their energy and food to raise their offspring. Even during the productive honey harvest, the bees did not restrict the laying of eggs by the queen bee, and a large amount of honey was used to feed and grow the larvae. In the first years of the use of the Italian race, the demand for them increased more and more. Later, complaints about low honey productivity and migration tendency of Italian bees began to be received from buyers of bee packages, and the need for yellow bees began to decrease sharply. But the Italian bees managed to contribute to the beekeeping of the republic, the characteristics of yellowness and migration

of local bees passed from them. The yellow color of bees has been preserved in some places to this day.

In the last decade of the last century, gray North Caucasian queen bees from the Krasnopolyansk bee nursery, Carpathian queen bees from Maykop, prionic race group queen bees from the Research Institute of Beekeeping were brought and tested in limited quantities. However, none of them gave a positive result like the bees of the Carpathian race of the Mukachevo bee nursery in the Zakarpattia region of Ukraine.

Targeted use of the original source of Carpathian bees began in the 2000s. The well-founded criticism of beekeepers of Kazakhstan and Russia, the main consumers of bee packages, about the bees of Central Asia forced beekeepers of the republic to engage in the breeding of bee breeds that are competitive and in demand in the market. At the same time, it was necessary to take into account local natural and climatic conditions, such as long active summers and short winters, separated by weak honey production.

It turned out that breeding of the Carpathian race of bees is the best way. Several factors contributed to this. First of all, there is a high demand for this breed of bees in the market and it is oriented towards export. Secondly, it is possible to breed it effectively both in the mountainous regions of Uzbekistan and in the desert zone. At the same time, the number of migrations decreases by several times, the growth rate and, accordingly, the strength of bee families increases, the resistance of bees to winter and diseases improves. Thirdly, it is distinguished by high honey productivity compared to local bees. 30-50% increase in honey consumption is recognized by almost all beekeepers. Purebred families can't tolerate our hot summer months, you have to pay more attention to their shading and ventilation, but the increase in productivity completely compensates for all these inconveniences. When selling bee packages, they give a high price for Carpathian families, and there is almost no demand for bees of local breed, and this factor is also important.

Every year, 2-2.5 thousand queen bees belonging to all types of the Carpathian race - Vuchkovskii, Hoverla, Rakhovskii and Sinevir - are brought to Uzbekistan from western Ukraine (200-300 purebred queen bees in 2023-24). The distribution of imported queen bees by regions of the republic is uneven. Most of the Carpathian queen bees are purchased in the package beekeeping zone, and first of all, in the Fergana Valley, where more than 80% of all bee packages of the republic are produced and exported. Carpathianization of bees in these regions increased by more than 90%.



Figure 1. Figure 2 for distribution to beekeepers. A male of the Carpathian race of the Goverla type

Fertilized queen bees of the Carpathian race. bees

Since 2016, the Karnica race of bees (carnica) has been brought to the republic from Germany and Austria and tested. Carnica bees are close to Carpathian bees, but they are the most and best selected for honey production and strength of the bee family. Their use against the background of Carpathian bees made it possible to increase honey productivity by about 20%, improvement of almost all economic useful signs is observed. Every year, 200-300 fruitful fertilized queen bees of the Karnika breed are brought to the republic.

In accordance with the Decision of the President of the Republic of Uzbekistan dated October 16, 2017 on measures for the further development of the beekeeping industry in the Republic No. PQ-3327, separate breeding centers for the breeding of Carnica and Carpathian breeds of queen bees have been established in some regions. One of the breeders of Carpathian and Karnika queen bees is the breeding farm of Fergana region beekeepers association. Every year, more than 30,000 unborn queen bees and queen bee sponges of Karnica and Carpathian breeds, as well as more than 3,000 fertilized queen bees are delivered.

In order to study the results of the Carpathianization of bees, in 2011, samples of bees were taken from 6 apiaries belonging to the beekeepers' association of Fergana region and sent to the Research Institute of Beekeeping of the Russian Federation. As a result of the study of the length of the horn, the width of the 3rd tergite, the cubital and tarsal indices, the morphological parameters of the discoidal shift in six bees and their comparison with the standard of the Carpathian race, it was concluded that the bee families correspond to the Carpathian race in the set of most characteristics.

Expertise results - exterior indicators of bees in the applications of the beekeepers' association of Fergana region about suitability of a certain breed of bees.

Sam ple No	Khartoum length, mm		3rd tergite width, mm		Cubital index, %		tarsal index, %		Discoidal displacement, %		
	M+t	C v, %	M+t	C v, %	M+t	Cv	M+t	C v	<+>	<0>	<->
№1	6.61+0. 02	1. 2	4.78+0. 02	2. 3	38.2+0. 92	13. 1	57.8+0. 21	2. 0	83.3	16.7	-
№2	6.36+0. 16	3. 7	4.71+0. 02	2. 0	48.6+1. 30	14. 8	58.6+0. 33	3. 0	63.3	23.4	13.3
№3	6.50+0. 03	2. 7	4.76+0. 03	3. 1	43.8+1. 37	17. 2	59.4+0. 38	3. 5	63.3	23.4	13.3
№4	6.49+0. 02	2. 0	4.74+0. 03	2. 9	42.3+1. 39	18. 0	58.5+0. 48	4. 5	33.3	30.0	36.7

№5	6.65+0. 02	1. 9	4.73+0. 02	2. 5	42.3+1. 05	13. 6	58.4+0. 49	4. 6	40.0	26.7	33.3
№6	6.63+0. 03	1. 9	4.86+0. 02	2. 4	42.2+1. 04	13. 5	58.0+0. 28	2. 6	83.3	16.7	-
Car path ians race breed er	6.4-6.7		4.5-5.0		45-50		53-58		musbat		

The results of the expert examination on the suitability of a certain breed of bees showed that the selection work on the Carpathianization of bees in Uzbekistan, in particular, in the Fergana Valley, had its first positive results during the last 10 years. Gave

In 2021, studies of the pure breed of bees of the Fergana beekeepers' association were carried out by molecular genetic methods at the Institute of Biochemistry and Genetics, Institute of Biochemistry and Genetics, Biochemistry and Genetics Institute of the Russian Academy of Sciences of the Republic of Bashkortostan, Russian Federation. Molecular-genetic methods were used to differentiate between *A. mellifera* bee races and phylogenetic studies. Mitochondrial DNA (mt DNA). DNA nuclear genome and microsatellite loci, polymorphism of individual loci are analyzed.

Currently, according to the data of morphometric analysis, as well as the results of the study of mtDNA, yDNA and microsatellite loci, the races of *A. mellifera* are grouped into 5 evolutionary groups - A, M, S, O and Y and additional subgroups, for example, Subgroup Z of A line.

Evaluation group A includes 11 races (African races), M group 2 races (*A.m. mellifera* - European dark forest race, including Middle Russian bee race and *A.m. iberiensis*, Spanish race bees), C group includes 7 races (*A.m. carnica* and other bees of Eastern Europe and Asia Minor), group O - 5 races (bees of the Middle East), and group Y only 1 race (Ethiopian). At the same time, the taxonomy of bees *A. mellifera* is not fully resolved. Some races of bees, for example, *A. m.* The place of Karpatka has not been agreed to the end. The Carpathian race was considered both as an independent race, as a geographic race (*A. m. Karnica* race) and as an ecotype.

Mitochondrial DNA is passed from generation to generation only through queen bees, and the DNA markers of the nuclear genome are passed from generation to generation through both male bees and queen bees (bees do not have sex chromosomes). More than 2000 microsatellite loci have been described in honeybees. These loci are actively used to describe the genetic characteristics of different populations and evaluation groups of bees, to assess the genetic diversity within and between races, and to determine the level of introgression between different evaluation groups of bees.

Bee races differ in the genetic characteristics of mtDNA, for example, in variants of the CO I- CO II locus (the sequence between the cytochrome oxidase I and cytochrome oxidase II

genes). The region between the CO I CO II genes consists of two nucleotide sequences R , which can be represented by R0, R1 or R2 and Q variants. Evaluative groups of bees are distinguished by the number of copies of R (1 or 0) and Q (1 to 5) sequences. For example, the Eastern European C group has the shortest sequence of this intergenic region (y has only one copy of the Q element, no R sequence), and the M, A, Z, and Y group bee races are characterized by a larger sequence because they have R along with element 1 to 5 Q elements (that is, they have the variants RQ, RQQ, RQQQ, RQQQQ, and RQQQQQ).

In all bee samples sent from Uzbekistan, one Q allele is found at mtDNA loci, which indicates that the studied bee samples belong to the evaluation group C.

Allelic variants of CO I COII and microsatellite alleles Ar243, 4a110, A24, A8, A43, A113, A88, Ar049, A28 loci in the study sample.

№	CO I- II	Ar243	4a110	A24	A8	A43	A113	A88	Ar049	A28
1	Q	11	11	22	13	22	11	13	22	22
2	Q	11	11	22	33	22	11	22	34	22
3	Q	11	11	22	33	22	11	23	13	22

Bees for molecular genetics research, Fergana district, Fergana region (1 sample). It is selected in the applications of Fergana city (sample number 2) and Yozyavon district (sample number 3). The degree of introgression of genes of bee families of evaluation groups M and C, calculated on the basis of polymorphism analysis of Ar243, 4a110, A24, A8, A43, A113, A88, Ar049, A28 microsatellite loci.

№	mtDNK		yaDNK	
	CO I- CO II	C share	Share of M	
1	Q	0.98	0.02	
2	Q		0.99	0.01
3	Q		0.99	0.01

Studies on the pure breed of bees have shown that they belong to the evaluation group C. Since 2000, the Carpathian race of bees has been regularly imported and interbred with local bees using the method of blood impregnation, as well as the method of blood transfusion of the Karnica race in the last 5-6 years, which has led to the formation of the homogeneity of bees. It shows the high uniformity of the genetic structure of bees in the studied samples, that is, A. m. belonging to another evaluation group carnica and A. m. the level of access to the genes of Carpathian races is low and does not exceed 1-2%. Later, it is planned to use Carpathian queen bees brought from the original source by blood transfusion, and from time to time, if necessary, inoculation with blood transfusion of Carnica bee breed from Germany and Austria.

Not all races of bees can adapt to the specific conditions of Uzbekistan: hot, dry summer, relatively weak honey-eating, long active period and short winter. Perhaps this is due to the strength of local bees, which, unlike other races, have been able to adapt to the existing

climate and honey-eating conditions during their 150-year lifespan. Today, although it cannot compete with the widespread and productive breeds of bees, its population constitutes a valuable gene pool of the country, which is in demand by breeders.

In the territories of our republic, scientific institutions, laboratories, and breeding farms are engaged in the conservation, maintenance and reproduction of regional breeds. In this, their capabilities are limited - they only have a certain influence on the minds of beekeepers. Breeding farms are also responsible for negligent treatment of the regionalization plan of beekeeping races. In this case, the queen bees are removed from the reproducers, the packages are sold without control due to the payment for merchandising, and the fogging plan of the bee colony is violated.

Conclusion. In beekeeping, it is important to take strict measures to maintain the bee breeds recommended for breeding, to improve and increase the breed and offspring, and to introduce effective technologies.

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