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M. K. Chugreev[1], D. A. Baimukanov[2], G. I. Blokhin[1], L. V. Malovichko[1], A. M. Zubaliy[1], E. G. Skvortsova[3], D. A. Doshanov[4], I. S. Tkacheva[1], S. A. Kruglov[1]

[1]Russian State Agrarian University - Moscow Agricultural Academy named after K. A. Timiryazev, Moscow, Russia;
[2]Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan;
[3]Yaroslavl State Agricultural Academy, Yaroslavl, Russia;
[4]M. Auezov South Kazakhstan State University, Shymkent, Kazakhstan.
E-mail: Chugreev-mk@mail.ru, dbaimukanov@mail.ru, baimukanov.dastanbek@bk.ru, zoolog@rgau-msha.ru, l-malovichko@yandex.ru, zanast@mail.ru, e.skvorcova@yarcx.ru, dauliet70@mail.ru, oxotkontr-tis@mail.ru, oxotkontr-ks@mail.ru

THE CURRENT STATE OF THE EUROPEAN DARK BEE SUBSPECIES Apis mellifera mellifera L. IN THE NORTH RANGE OF THE RUSSIAN FEDERATION

Abstract. The research to determine the factors with a negative impact on the resource status of honey bees in the Russian Federation has been done.

Based on the research results, a simple and affordable rapid test for determining the origin of bees was proposed, based on the study of a complex of morphological and biological characteristics of working bees, such as proboscis length, cubital index, discoid displacement, the shape of the rear border of the wax plate of sternite 5, body color, the character of the honey seal, behavior of bees during the examination of the nest and phototaxis. The test is suitable for detecting bee crossbreeding during their mass selection since the listed morphological and biological traits are the most contrasting and indicative among others.

The indicated morphological and biological characteristics of bees from the Yaroslavl, Vologda, Kostroma regions, Perm Territory were studied.

In the Susaninsky district of the Kostroma region, the bee colonies were identified that correspond to the European dark bees Apis mellifera mellifera L. according to the studied traits. From them, breeding material was taken and evaluated for further breeding and the creation of a nursery reproducer.

In conclusion, a landmark is given, a promising direction of work is indicated for the conservation and restoration of the resources of the European dark bees in the current conditions of mass unsystematic crossbreeding in the north of their historical range.

Key words: Apis mellifera mellifera L. European dark bees, breeding material selection, morphological and biological traits.

Introduction. Beekeeping in the Russian Federation has transformed from business to a full-fledged agricultural sector. Beekeeping is one of the most important agricultural methods for growing entomophilous cultures [1]. Stocks of nectar in Russia are such that with efficient beekeeping, honey can become a national wealth.

The research by A.I. Skvortsov., V.G. Semenov., V.N. Sattarov., D.A. Baimukanov, D.A. Doshanov, et al. "It has been proved that favorable prerequisites for the development of bee colonies and high honey flow are created when the apiary is surrounded by melliferous lands landscapes: forests, meadows, gardens, fields, and windbreaks with the biodiversity of nectar-bearing flora, i.e. continuous honey flow appears or a flower-nectar conveyor is created... Correctly compiled data of long-term phenological records and a flowering calendar of entomophilous plants guarantee for beekeepers the ability to more

intelligently coordinate their activities in the management of beekeeping and improve honey flow by including newly introduced plants in the flower conveyor that more fill the non-harvesting periods. With confidence, we can hope that, based on an analysis of regular long-term phenological records, each beekeeper can predict honey flow and make an adjustment to the technology of keeping and caring for bee colonies [1].

Honey bees occupy their place in the ecological niche, play an important role, performing specific functions in biocenoses [2-4]. At the same time, the natural balance does not change in any way as it is disturbed during deforestation, overfishing, and gaming animals. On the contrary, bees contribute to increasing yields and improving the quality of seeds and fruits of wild plants, which are food, and, therefore, one of the main conditions for the existence of many animal species [5].

Currently, in the Russian Federation, many geographical forms of honey bees formed during evolution have been crossbred, including European dark bees (Apis mellifera mellifera L. 1758), which are very difficult to find preserved. Crossbred bees do not have great economic and, especially, breeding values [6,7].

All geographical species of honey bees must be preserved. Each of them is unique, inimitable, and of exceptional importance as an economic entity, as a link in the ecological chain and as a gene pool in the conservation of biodiversity.

The aim of the research. Analysis of modern honey bees in the regions of Russia by their origin, identification of the European dark bees Apis mellifera mellifera L., selection and evaluation of breeding material for further breeding and selection.

The research methods. During expedition trips to Russian regions to find the European dark bees, the apiaries were examined in the Lyubimsky, Poshekhonsky and Nekrasovsky districts of the Yaroslavl region, in the Velikoustyugsky and Totemsky districts of the Vologda region, in the Susaninsky district of the Kostroma region, in the Krasnovishersky district of the Perm Territory.

During the work, the methodology for assessing the classes of honey bee morphotypes according to F. Ruttner was used [7]. The identification was carried out visually using a hand lens; for photo documentation, a Macro lens for LG Ray smartphone was used.

To determine the breed, 30 working bees were taken from the nest of each studied colony.

Samples were examined according to the “Guidelines for the control of purebred honey bees, the determination of pollen productivity and wax content in propolis” [8].

The queen thoroughbredness was evaluated by the quality of their offspring, i.e. by the quality of their daughters - the working bees. Using the proposed rapid test we studied the morphological characteristics of working individuals with temporary glycerin preparations: proboscis length, cubital index, discoidal displacement, the shape of the posterior border of the wax plate of sternite 5. Biological traits: body color of working bees, the nature of the honey seal, the behavior of the bees when examining the nest, phototaxis. The listed morphological characteristics are the most contrasting and indicative among others.

The measurement was conducted using an MBS-9 binocular microscope.

The bee queen was excreted by the Pratt-Doolittle method in queen fewer families-nurseries. Statistical processing of the data obtained during the research was performed with the Statistica 8.0 software package.

The research results. In the course of evolution, a rich variety of geographical forms of honey bees has been formed, each of them is distinguished by its characteristic properties, represents breeding and economic value [9-11].

Bees adapted for the specific conditions of existence and are differentiated into subspecies, which are now often called primitive or native breeds.

Unlike domestic animals, natural selection in honey bees is aimed at improving those traits that are beneficial not only to the bee colony, but also to humans: intensive development, high honey and wax productivity, winter hardiness, disease resistance, etc. Therefore, the concepts of "primitiveness" and “indigenousness” concerning honey bees are hardly applicable. We believe that following the modern taxonomy adopted in zoology, these are geographic subspecies.

In Russian beekeeping, these subspecies traditionally continue to be called breeds. However, for several reasons, most of them were crossbred. In particular, it is very difficult to find the clean, The

European dark bees Apis mellifera mellifera L. [11,12]. European dark bees are characterized by high fecundity of queens, good winter hardiness, intensive spring development, resistance to many diseases, effective use of short plentiful northern honey flow, etc. Crossbred bees do not have great economic and, especially, breeding values [13].

Mass unsystematic crossbreeding of honey bees in the USSR, and then in the Russian Federation, was served by several reasons.

Firstly, beekeepers learned to move bee colonies over long distances without causing significant damage to them. Often this has been done and continues to be done unfoundedly.

Secondly, the low level of competence of beekeepers in matters of selection and breeding could become an important reason.

As an example, we cite factual evidence on the distribution of Carpathian laying queens from the Bekansky bee collective farm of the North Ossetian ASSR. Only in 1974, it was delivered: to the Lipetsk region - 1750 queens, to Kirov - 820 queens, to Smolensk - 1200 queens, to Tula - 1740 queens, to Leningrad - 810 queens, to Moscow - 920 queens, to Yaroslavl - 200 queens, to the Bashkir ASSR - 200 queens, to the Tatar ASSR - 155 queens and many other regions and republics of the former USSR [14].

The delivery of southern, in particular, gray mountain Caucasian bees (Apis mellifera caucasica L.) into the central and northern regions of the USSR and the Russian Federation had a very deleterious influence on the resources of the European dark bees.

Currently, in Russia, there is a demand for Carpathian bees, but they are practically not supplied from Ukraine. Therefore, Caucasian beekeepers switched to their breeding and massively supply bee packages and laying queens to different regions of Russia.

It should be noted that the reproduction of the Carpathian bees in the North Caucasus occurs in the natural habitat of Caucasian honey bees. Therefore, breeding material that comes from the North Caucasus region is often crossbred [15].

Recently, bee packages from Uzbekistan have been massively imported to Russia. Sellers declare them as Apis mellifera carnica L., which also raises reasonable doubts.

In such a way, bees declared by the suppliers as Carpathian (Apis mellifera carpatica L.), but being complex interbreeds, continue to be imported into the central and northern regions of Russia.

As a result of many years of massive importation of complex crossbreeds and the ongoing uncontrolled crossbreeding, there has been a decrease in the economic and biological value of bees in a significant part of Russia.

Therefore, for successful breeding of the European dark bees in the central and northern parts of the Russian Federation, it is important to be able to distinguish them, first of all, from the Carpathian ones. Moreover, to start and conduct large-scale breeding work, it is necessary to equip beekeepers practitioners with a simple, affordable, and operational method (rapid test) to establish these differences.

It is also necessary to clearly understand the main criteria by which it is possible to determine the thoroughbredness of the European dark bees. DNA research for the vast majority of beekeepers, both scientists, and practitioners is not available due to its high cost, complexity, and often imperfections in the procedure.

Based on the scientific and theoretical foundations of the morphology of honey bees, they proposed an express method for establishing differences between the European dark and the Carpathian bees. It is based on the use of the four most contrasting and stable morphological traits of working individuals, such as the proboscis length, cubital index, discoid displacement, the shape of the rear border of the wax plate of sternite 5 and four biological features, such as the body color of working bees, the nature of the honey seal, the behavior of the bees upon the nest inspection, phototaxis.

In these two subspecies of honey bees, the listed morphological and biological characters are contrasting and therefore easily distinguishable (table 1).

Biological traits. Body color: European dark bees - dark, almost black without yellowness, Carpathian bees - silver-gray without yellowness; the nature of the honey seal: in European dark bees and Carpathian bees - white, in Caucasian bees - dark; behavior on honeycombs: European dark bees - worry, run around the honeycombs, hanging from them in grapes, Carpathian - behave calmly; phototaxis: in European dark bees - negative (go to the unlit side of the honeycomb), in Carpathian bees - positive (do not respond to light).

Table 1 – The most contrasting traits of working bees for the rapid test when establishing differences between subspecies Apis mellifera mellifera L. and Apis mellifera carpatica L. (Morphological traits are given according to Gubin V.A., Cherevko Yu.A., 1988)

Morphological traits		
Trait	European dark bees (Apis mellifera melliferaL.)	Carpathian bees (Apis mellifera carpatica L.)
Proboscis length, mm	5.7 – 6.4 M=6.2	6.3 – 7.0 M=6.6
Cubital index	1.6	2.5
Discoid displacement	negative	positive
The shape of the rear border of the wax plate of sternite 5	straight	curved

An analysis of the breeding composition of honey bees in the Yaroslavl region revealed that the bees of all the studied bee colonies were characterized by great morphological diversity. That is, in the 80s of the twentieth century, there were almost no European dark bees left. There was only the probability of finding their individual colonies in remote forest areas in small apiaries [5]. It has been established that after three decades, at the present stage, a similar picture is observed with the species composition of honey bees in the Yaroslavl region. We examined bees in separate apiaries in the Lyubimsky, Poshekhonsky, and Nekrasovsky districts.

The results of the study of the morphological traits of working bees in the Lyubimsky district (the village of Palagino, the village of Pokrov) are shown in table 2.

Table 2 – Morphological tracts of bees from the apiary of the Lyubimsky district, (n = 30) (there are 156 bee colonies on the apiary)

No	Proboscis length, mm			Cubital index			The shape of the rear border of the wax plate of sternite 5, %			Discoid displacement, %		
	lim	M±m	Cv,%	lim	M±m	Cv,%	straight	curved	indefinite	+	–	0
1	5.5-6.2	5.9±0.021	2.79	1.4-2.2	1.76±0.046	15.27	75	25	–	–	90	10
2	5.4-6.3	5.9±0.024	2.0	1.6-2.5	1.90±0.041	12.40	97	3	–	16	58	26
3	5.7-6.3	6.0±0.022	2.14	1.5-2.5	2.06±0.052	18.16	80	20	–	15	60	25
4	5.8-6.2	5.9±0.029	2.32	1.4-2.7	1.94±0.034	13.20	96.7	3.3	–	24	46	30
5	5.7-6.3	6.0±0.015	2.29	1.4-2.3	1.90±0.042	17.23	71.5	28.5	–	14	36	50
6	5.6-6.3	6.1±0.027	2.31	1.4-3.1	2.00±0.036	12.18	75	25	–	35	45	20
7	5.7-6.2	6.0±0.018	2.12	1.4-2.3	1.90±0.032	15.30	100	–	–	–	87	13
8	5.8-6.3	5.9±0.027	2.13	1.3-2.8	1.90±0.045	14.50	93	7	–	6	74	20
9	5.3-6.2	6.0±0.022	2.27	1.3-2.7	1.80±0.051	13.67	95	5	–	40	20	40
10	5.7-6.2	5.9±0.024	2.32	1.4-2.4	1.80±0.045	15.42	97	3	–	6	58	36
11	5.8-6.2	6.0±0.026	2.29	1.7-2.6	1.90±0.037	12.89	80	20	–	30	45	25
12	5.9-6.2	5.9±0.023	2.31	1.5-2.5	1.90±0.038	15.70	94	6	–	4	72	17

From the data of table 2, it can be seen that in this apiary, the average value of the proboscis length varied between colonies within 5.9 - 6.1 mm, which corresponds to the value of this indicator of the European dark bees.

The average value of the cubital index ranged between 1.76 - 2.06 between colonies. In the vast majority of bee colonies, the value of this indicator occupied an intermediate position between the European dark and Carpathian bees.

According to the trait of discoidal displacement, they were characterized by the following indicators: a positive displacement was observed in colonies in 0–40% of cases, neutral in 10–50% of cases, negative in 20–90% of cases, i.e. on this basis, they gravitated towards the European dark bees.

By the shape of the rear border of the wax plate of the fifth sternite, the bees of this apiary were approximating to the European dark ones. This indicator had the following values for colonies: the straight shape was noted in 71.5 - 100% of cases, the curved - in 0 - 28.5% of cases, the indefinite one did not occur.

Biological traits: yellowness in the color of tergites of the working bees were present in 78% of colonies. A dark honey seal was found only in 4 colonies, which amounted to 2.6%, in 9 families, there was a mixed seal, which amounted to 5.8%, and 91.6% of colonies had a dry honey seal. Bees of almost all colonies were worried when examining the nest. At the same time, they ran around the honeycombs and "flowed" from them, hanging in grapes and going to the unlit side of the honeycomb.

Thus, the investigated bees of the Lyubimsky district could not be characterized as the European dark by morphological characteristics, although they were inclined towards them according to some indicators.

The studied bees of the Nekrasovsky district cannot be unambiguously attributed to any subspecies by the studied traits, although there is a tendency to deviate them towards the Carpathian bees.

According to the studied morphological traits, the bees of the Poshekhonsky district cannot be attributed to any subspecies, they are crossbreeds of supposedly the European dark and the Carpathian bees.

The research results of bees in the Krasnovishersky district of Perm Territory, Veliky Ustyugsky, and Totemsky districts of the Vologda region also do not allow us to unambiguously attribute them to the European dark ones.

The obtained data may indicate that the bees of all the examined apiaries are complex crossbreeds of unknown generations whose origin is not possible to establish. Breeding work with such material is not effective.

Of the 18 examined bee colonies of the Susaninsky district of the Kostroma region, seven were selected that according to morphological and biological characteristics corresponded to the European dark bees (table 3).

Table 3 – Morphological traits of the bees from Susaninsky district of Kostroma region, (n = 30)

No.	Proboscis length, mm			Cubital index			The shape of the rear border of the wax plate of sternite 5, %			Discoid displacement, %		
	lim	M±m	Cv,%	lim	M±m	Cv,%	straight	curved	indefinite	+	–	0
1	5.5–6.2	5.90±0.038	3.56	1.5–2.3	1.70±0.182	11.76	93	–	7	–	95	5
2	5.5–6.2	5.90±0.029	2.71	1.4–2.2	1.66±0.049	15.34	91	–	9	–	94	6
3	5.7–6.1	5.97±0.024	2.18	1.5–2.5	1.59±0.042	12.78	95	–	5	–	98	2
4	5.7–6.1	5.90±0.026	2.37	1.2–2.2	1.68±0.051	16.47	96	–	4	–	94	6
5	5.6–6.2	5.90±0.029	2.71	1.4–2.3	1.55±0.040	11.58	92	–	8	–	93	7
6	5.9–6.2	6.10±0.020	1.80	1.4–2.3	1.62±0.046	13.89	90	–	10	–	92	8
7	5.9–6.2	6.01±0.022	2.00	1.4–2.7	1.53±0.047	15.29	97	–	3	–	99	1

The data in table 3 show that the average proboscis length varies between colonies from 5.9 to 6.1 mm, which corresponds to the European dark bees. Moreover, this symptom is quite stable, the values of the coefficient of variation for colonies are not high, lie in the range of 1.80-3.56%.

The average values of the cubital index vary between 1.53-1.70, which also corresponds to the value of this trait of the European dark bees. The values of the coefficient of variation of this trait by colony are in the range of 11.58-16.47%.

A positive value of the indicator of discoidal displacement, peculiar to the Carpathian bees, was not found. At the same time, negative discoidal displacement varies between colonies in the range from 92.0% to 99.0% of cases, which corresponds to the European dark bees.

The straight shape of the rear border of the wax plate of the 5th sternite, peculiar to the European dark bees, occurs in 91.0-97.0% of cases. The curved shape of this trait, peculiar to the Carpathian bees, is not noted.

About the studied biological traits, it should be noted that the honey seal on these seven bee colonies is white, the yellowness was absent in the body color of the working bees. When examining the nest, the

bees behaved very aggressively, were worried, “flowed” from the honeycombs, hanging in grapes, tried to leave on the unlit side of the honeycomb.

As a result, according to the studied morphological and biological traits, the bees of seven selected colonies from the Susaninsky district of the Kostroma region corresponded to the European dark bees Apis mellifera mellifera L. We began to use their queens as a source of breeding material for further breeding in an experimental apiary and creating a bee nursery-reproducer.

Conclusions. One of the main reasons for the decrease in the economic and biological value of bees in the great part of Russia was their massive uncontrolled crossbreeding. It turned out to be especially harmful in the northern regions of Russia - the historical range of the European dark bees.

In the course of the research, a remarkably high degree of crossbreeding of modern honey bees has been revealed. The studied bees of the Yaroslavl, Vologda regions, and Perm Territory cannot be unambiguously attributed to any subspecies, although some of them have a certain tendency of excursion of some of the studied traits towards the European dark or Carpathian bees. The obtained data indicate that the bees of all the examined apiaries are complex crossbreeds of unknown generations whose origin is not possible to establish.

The proposed complex of morphological and biological traits of the working bees, such as the proboscis length, cubital index, discoidal displacement, the shape of the rear border of the wax plate of sternite 5, the body color of the working bees, the nature of the honey seal, the behavior of bees when nest examining, phototaxis can be a simple and convincing rapid test to establish the bees' crossbreeding during their mass selection.

According to the studied morphological and biological characters, the bees of seven selected colonies from the Susaninsky district of the Kostroma region corresponded to the European dark Apis mellifera mellifera L. We started to use their queens as a source of breeding material for further breeding in the experimental apiary and creating the bee nursery-reproducer.

In such a situation of mass unsystematic crossbreeding, it seems appropriate and possible for us to intensively breed thoroughbred European dark bees and create solid arrays of them in vast territories of the northern part of the historical range of the Russian Federation.

М. К. Чугреев[1], Д. А. Баймұқанов[2], Г. И. Блохин[1], Л. В. Маловичко[1], А. М. Зубалий[1], Е. Г. Скворцова[3], Д. А. Дошанов[4], И. С. Ткачева[1], С. А. Круглов[1]

[1]«Ресей мемлекеттік аграрлық университеті – К. А. Тимирязев атындағы Мәскеу ауылшаруашылығы академиясы» ФМБМ, Мәскеу, Ресей;
[2]«Қазақ мал шаруашылығы және жем өндірісі ғылыми-зерттеу институты» ЖШС, Алматы, Қазақстан;
[3]Ярославль мемлекеттік ауылшаруашылығы академиясы ФМБМ, Ярославль, Ресей;
[4]М. Әуезов атындағы Оңтүстік Қазақстан мемлекеттік университеті, Шымкент, Қазақстан

РЕСЕЙ ФЕДЕРАЦИЯСЫНЫҢ СОЛТҮСТІК АЙМАҒЫНДАҒЫ Apis mellifera mellifera L ЕУРОПАЛЫҚ ҚАРА АРАНЫҢ КІШІ ТҮРЛЕРІНІҢ ҚАЗІРГІ ЖАҒДАЙЫ

Аннотация. Зерттеудің мақсаты – Ресей аймақтарындағы заманауи бал араларын олардың шығу тегіне қарай талдау, Apis mellifera melliferaL. еуропалық қара араны анықтау, одан әрі өсіру және іріктеу үшін асыл тұқымды материалды іріктеу және бағалау.

Аналықтың асыл тұқымдылығы ұрпақтарының сапасы бойынша, яғни аналығының – жұмысшы аралардың сапасы негізінде бағаланды. Біз ұсынған экспресс-тесттің көмегімен уақытша глицерин препараттарында жұмыс істейтін ағзалардың келесі морфологиялық белгілері зерттелді: бізтұмсық ұзындығы, кубитальды индекс, дискоидальды ығысу, бесінші құрсақ қалқаншаның балауыз айнасының артқы шекарасының пішіні. Биологиялық белгілері: жұмысшы аралардың денесінің түсі, бал кесегінің табиғаты, ұяны қарау кезіндегі аралардың мінез-құлқы, фототаксис. Аталған морфологиялық белгілер басқа белгілермен салыстырғанда айқын және үлгілі болып саналады. Өлшеу МБС-9 бинокулярлық микроскоп арқылы жүргізілді. Аналықтар жатырсыз тұқымдас-тәрбиешілерде Пратта-Дулитль әдісімен өсірілді. Зерттеу барысында алынған деректердің статистикалық өңделу жағдайы Statistica 8.0 бағдарламалық пакетінде сақталып отырды.

Жұмысшы аралардың морфологиялық белгілерін зерттеу нәтижелері бізтұмсықтың орташа ұзындығы тұқымдастар арасында 5,9-6,1 мм аралығында өзгергенін көрсетті, бұл еуропалық қара ара көрсеткішінің

мәніне сәйкес келеді. Кубитал индексінің орташа мәні тұқымдастарда 1,76-2,06 аралығында көрінді. Ара ұясының көпшілігінде бұл көрсеткіш мәні еуропалық қара және карпат аралары арасындағы орынды иеленді. Дискоидальды ығысудың белгісі бойынша аралар келесі көрсеткіш бойынша сипатталды: 0-40% жағдайда тұқымдастар арасындағы оңтайлы ығысу байқалды, 10-50% жағдайда бейтарап, 20-90% жағдайда теріс, яғни осы белгілері бойынша олар еуропалық қара түріне қарай тартыла бастады.

Бесінші құрсақ қалқаншаның балауыз айнасының артқы шекарасы пішіні бойынша омартаның арасы еуропалық қара түрге жақындай түсті. Бұл көрсеткіш олардың тұқымы бойынша келесі мәнге ие болды: тікелей форма 71,5-100% жағдайда, қисық форма – 0-28,5% жағдайда, ал белгісіз форма кездеспеді.

Биологиялық белгілері: жұмысшы ара термитінде сарғыш түс тұқымның 78%-да кездесті. Балдың қара кесегі тек 4 тұқымында табылды, сәйкесінше 2,6% құрады, 9 тұқымында аралас кесек анықталды, бұл 5,8% құрады, тұқымның 91,6%-ында балдың құрғақ кесегі бар болып шықты. Ұяны тексеру кезінде тұқым аралары бірқалыпты жағдайда болмады. Ұяның қараңғы жағына қарай ұша берді. Осылайша Любимский ауданында зерттелген аралардың кейбір көрсеткіштері бойынша бейім келсе де, морфологиялық белгілері бойынша қара түсті еуропалық деп сипаттауға болмайды.

Алынған мәліметтер барлық зерттелген омарталардың арасы белгісіз тұқымның күрделі буданы екендігін көрсетті, сол себептен олардың шығу тегін анықтау мүмкін емес. Мұндай материалмен тұқымдық жұмыстарды жүргізу де тиімсіз.

Ресей аумағының едәуір бөлігіндегі араның экономикалық және биологиялық құндылығының төмендеуінің негізгі себебінің бірі – олардың жаппай бақылаусыз будандастырылуы. Әсіресе, еуропалық қара араның тарихи аймағы – Ресейдің солтүстігінде зиынды болды. Жаппай жүйесіз будандастырудың мұндай жағдайында асылтұқымды еуропалық қара араны қарқынды өсіріп, Ресей Федерациясының тарихи солтүстік аймақтарында араның үздіксіз ауқымын қалыптастырған жөн деп санаймыз.

Түйін сөздер: Apis mellifera mellifera L. европалық қара түсті ара, асылтұқымды материал таңдау, морфологиялық және биологиялық белгілер.

М. К. Чугреев[1], Д. А. Баймуканов[2], Г. И. Блохин[1], Л. В. Маловичко[1], А. М. Зубалий[1], Е. Г.Скворцова[3], Д. А. Дошанов[4], И. С. Ткачева[1], С. А. Круглов[1]

[1]ФГБОУ ВО «Российский государственный аграрный университет – Московская сельскохозяйственная академия им. К. А. Тимирязева», Москва, Россия;
[2]ТОО «Казахский научно-исследовательский институт животноводства и кормопроизводства», Алматы, Казахстан;
[3]ФГБОУ ВО Ярославская государственная сельскохозяйственная академия, Ярославль, Россия;
[4]Южно-казахстанский государственный университет им. М. Ауэзова, Шымкент, Казахстан

СОВРЕМЕННОЕ СОСТОЯНИЕ ПОДВИДА ТЕМНЫХ ЕВРОПЕЙСКИХ ПЧЕЛ Apis mellifera mellifera L. НА СЕВЕРЕ ИХ АРЕАЛА В РОССИЙСКОЙ ФЕДЕРАЦИИ

Аннотация. Цель исследований – анализ современных медоносных пчел в регионах России по их происхождению, выявление темных европейских пчел Apis mellifera melliferaL., отбор и оценка племенного материала для дальнейшего разведения и селекции.

Чистопородность маток оценивали по качеству их потомства, т.е. по качеству их дочерей – рабочих пчел. С помощью предложенного нами экспресс-теста изучались морфологические признаки рабочих особей на временных глицериновых препаратах: длина хоботка, кубитальный индекс, дискоидальное смещение, форма задней границы воскового зеркальца пятого стернита. Биологические признаки: окраска тела рабочих пчел, характер печатки меда, поведение пчел при осмотре гнезда, фототаксис. Перечисленные морфологические признаки наиболее контрастны и показательны среди прочих. Измерение проводили с помощью бинокулярного микроскопа МБС-9. Матки выводились способом Пратта-Дулитля в безматочных семьях-воспитательницах. Статистическая обработка полученных в ходе исследований данных – в программном пакете Statistica 8.0.

Результаты изучения морфологических признаков рабочих пчел показали, что среднее значение длины хоботка варьировало по семьям в пределах 5,9 - 6,1 мм, что соответствует значению этого показателя темных европейских пчел. По признаку дискоидального смещения пчелы характеризовались следующими показателями: положительное смещение наблюдалось по семьям в 0 - 40% случаев, нейтральное - в 10 - 50% случаев, отрицательное - в 20 - 90% случаев, т.е. по данному признаку они тяготели к темным европейским.

По форме задней границы воскового зеркальца пятого стернита пчёлы этой пасеки приближались к темным европейским. Этот показатель у них имел по семьям следующие значения: прямая форма отмечалась в 71,5 - 100% случаев, выгнутая - в 0 – 28,5% случаев, неопределенная – не встречалась.

Биологические признаки: желтизна в окраске тергитов рабочих пчёл присутствовала в 78% семей. Темная печатка меда была обнаружена лишь в 4-х семьях, что составило 2,6%, в 9-ти семьях была смешанная печатка, что составило 5,8%, у 91,6% семей была сухая печатка меда. Пчелы практически всех семей беспокоились при осмотре гнезда. Они при этом бегали по сотам и «стекали» с них, повисая гроздьями и уходя на неосвещенную сторону сота. Таким образом, исследованные пчелы Любимского района по морфологическим признакам не могли быть характеризованы как темные европейские, хотя по некоторым показателям склонялись к ним.

Полученные данные могут говорить о том, что пчёлы всех обследованных пасек представляют собой сложные помеси неизвестных поколений, происхождение которых установить не представляется возможным. Вести племенную работу с таким материалом неэффективно.

Одной из основных причин снижения хозяйственной и биологической ценности пчел на значительной части территории России послужила их массовая бесконтрольная метизация. Особенно пагубной она оказалась в северных регионах России – историческом ареале темных европейских пчёл. В такой ситуации массовой бессистемной метизации нам представляется целесообразным и возможным интенсивное разведение чистопородных темных европейских пчел и создание сплошных их массивов на обширных территориях северной части исторического ареала РФ.

Ключевые слова: темные европейские пчелы Apis mellifera mellifera L., отбор племенного материала, морфологические и биологические признаки.

Information about the authors:

Chugreev Mikhail Konstantinovich, Doctor of Biological Sciences, Professor of the Department of Zoology, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; Chugreev-mk@mail.ru; https://orcid.org/0000-0001-5876-8715

Baimukanov Dastanbek Asylbekovich, Corresponding Member of the National Academy of Sciences of the Republic of Kazakhstan, Doctor of Agricultural Sciences, Chief Researcher of the Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; dbaimukanov@mail.ru; https://orcid.org/0000-0002-4684-7114

Blokhin Gennady Ivanovich, Doctor of Agricultural Sciences, Professor, Head of the Department of Zoology, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; zoolog@rgau-msha.ru; https://orcid.org/0000-0002-1235-6069

Malovichko Lyubov Vasilievna, Doctor of Biological Sciences, Professor of the Department of Zoology, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; l-malovichko@yandex.ru; https://orcid.org/0000-0003-1040-2890

Zubaliy Anastasia Mikhailovna, Candidate of Biological Sciences, Associate Professor of the Department of Zoology, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; zanast@mail.ru; https://orcid.org/0000-0002-5114-830X

Skvortsova Elena Gamerovna, Candidate of Biological Sciences, Associate Professor, Head of the Department of Zootechnics, Yaroslavl State Agricultural Academy, Yaroslavl, Russia; e.skvorcova@yarcx.ru; https://orcid.org/0000-0003-0699-7959

Doshanov Daulet Askarovich, Candidate of Agricultural Sciences, M. Auezov South Kazakhstan State University, Shymkent, Kazakhstan; dauliet70@mail.ru

Tkacheva Irina Sergeevna, postgraduate student of the Department of Aquaculture and Beekeeping, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; oxotkontr-tis@mail.ru; https://orcid.org/0000-0002-7988-7112

Kruglov Sergey Alekseevich, postgraduate student of the Department of Zoology, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev, Moscow, Russia; oxotkontr-ks@mail.ru; https://orcid.org/0000-0002-3343-461X

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