дақылдарды тозаңдандыру үшін ең тиімді тұқымдарды анықтауды қамтиды. Ара тұқымдарының гибридтенуінің алдын алу үшін ғылыми қызметкерлер мезгіл-мезгілімен тұқымдық құрамы мен шаруашылыққа-пайдалы белгілеріне мониторинг жүргізеді. Ара отбасының өсу қарқыны оның қысқы төзімділігін сипаттайтыны және өнімділікке тікелей әсер ететіні анықталды. Осы белгіге сүйене отырып, өсіру үшін жұмыртқалағыштығы жоғары болған аналықты таңдау керек. Дала аймағының «Демидов» ЖК-дің омартасында аналықтың жұмыртқа салуы, орта есеппен 919,6 дана, ал дала аймағының «Гостинин» ЖК-де аналықтың жұмырқалауы 2 данаға аз. Тау бөктері мен таулы аймақта, далалық аймаққа қарағанда 14,6 дана жұмыртқаға артта қалады. Ара отбасыларының өнімділігі, гүлді бал өсімдіктеріне көшу санына да байланысты. Мәселен, орташа бал өнімділігі мен балауыз өнімділігін стационарлық және көшпелі омартасымен салыстырған кезде өзгергіштік байқалады.

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METHODS FOR IMPROVING REPRODUCTIVE AND PRODUCTIVE ABILITIES OF QUEEN BEE IN THE SOUTH OF KAZAKHSTAN

ANNOTATION

A study was carried out on the development of breeding methods, improving the productive and reproductive qualities of queen bees. The intake and size of fed queen cells, the dependence of the mass of queens on the mass of the host family, the effect of honey-bee-bread feeding of host families on the volume of queen cells and the weight of queens, as well as various methods of replanting into full-fledged families were studied. It has been established that with less upbringing of queen cells, the nurse bees intensively fill the bowls with royal jelly, while the larvae that receive a large amount of food increase in size and, when they emerge, the weight of the barren queen increases. The quality of the queens is largely determined by the conditio ns of their cultivation and feeding in the nurse colonies, while it was determined that the highest live weight of the uterus is observed in strong nurse colonies with a composition of bees of different ages. The stronger the foster family was, the higher the quality of the queens. The most effective method of replanting fetal queens was the replanting of fetal queens in a cell, which guarantees a successful 85% intake. When using various methods of replanting fetal queens in full-fledged colonies, it was shown that it is much easier to plant a new queen in small colonies that are in a state of intensive growth than in strong ones, while young non-flying bees practically do not show aggressiveness towards the replanted queen.

Key words: *beekeeping, queen bee, hatching, mother liquor, egg tubes, live weight.*

Introduction. Full control over the mating of queens and drones is possible only with instrumental insemination. This allows us to significantly increase the efficiency of breeding work by obtaining breeding material with the desired properties. When breeding new lines and types of bees, breeding breeds and lines of bees in purity, crossing certain breeds and lines to obtain heterotic bees - this method is the main one. Instrumental insemination solves one of the main problems of mother breeding - it reduces the influence of weather conditions on the process of obtaining fetal queens. Using instrumental insemination, it is possible to obtain over early fetal queens, by the beginning of the formation of spring layering, regardless of weather conditions - rains and cold spells [1].

The production of fetal bees is associated with the formation of a nucleus park for maintenance, natural mating and the beginning of egg laying after mating by queen bees. When settling and using nuclei, gatherings of bees are often observed. The loss of queens during planting and mating flights reaches 50%. Using instrumental insemination, it is possible to significantly reduce the nuclear park, thereby reducing the time and maintenance costs [2].

In the production of infertile bee colonies, we drew attention to the fact that the depth of the bowl used for inoculation of the larva affects the reception of transferred larvae by bees, and the mass of hatched bee colonies. In most cases, the uterus breeders make bowls according to the prototype of the swarm -a depth of about 6 mm. This restriction is not entirely clear, since the educator's family feels rather the loss of the uterus, in which bees lay fistula queen cells based on a standard bee cell with a depth of 12.5 mm, and is not in a swarm state [3].

It is known that the quality of fetal queens deteriorates markedly with a significant defeat of bee colonies by varroa mites, due to the inferiority of drones raised in such families. With natural mating of queens with such drones, the uterus's seed receptacle can be partially filled, and with instrumental insemination, we can control the amount of sperm injected into the female's genital tract, which will save us from getting substandard queens.

When using the instrument for instrumental insemination, it was found that a lot of time is spent on performing operations to extract the ventral and sting hooks from the sting chamber before the sperm injection process begins. Therefore, in order to increase the productivity of the device during mass insemination of queen bees, it became necessary to simplify the operation of removing and removing hooks from the uterus sting chamber. In connection with the above, we decided to modernize the hook attachment units by providing them with a folding mechanism for quickly removing the hooks from the sting chamber [4].

Breeding work in the apiary - an important resource is to increase the productivity and improve the quality of honey bees. Measures aimed at selecting the best families in terms of a set of indicators, strict adherence to the technology of breeding females and males for mating, preventing the degeneration of bees on their own for a long time, creating favorable conditions that meet the natural needs of breeding bees, are the basis for the development of beekeeping [5].

One of the most important conditions for effective breeding of breeding bees is the presence of high - quality brood females in families. Despite many studies regarding the incubation of high-quality females, a certain part of the percentage loss still remains. During instrument insemination, losses can be reduced by fully controlling the mating of the female and male. This makes it possible to significantly increase the efficiency of breeding work by obtaining a thoroughbred bee with the necessary properties. When fertilizing the instrument, it is possible to obtain additional early fertilized females in spring weather conditions-regardless of rain and cold [6,7,8]. The production and storage care of fertilized queen bees is associated with natural mating and the beginning of egg laying after mating with Queen Bees. The accumulation of bees by planting in nucleuses is often observed, and when replanting and leaving for mating, the loss of females reaches up to 50% [9,10].

Apiaries of the southern region of Kazakhstan, due to favorable natural and climatic conditions, in addition to producing honey, specialize in the supply of early packages of relevant bees and fertilized queen bees to other regions. The biological features of breeding bees are well adapted to the climatic conditions of the region and are conducive to the introduction of new developments, improving methods for obtaining good quality sperm females [11,12,13,14]. In this regard, research was carried out to improve the productive and reproductive properties of Queen Bees in the south of Kazakhstan and to develop breeding methods [15, 16].

Research materials and methods. The object of the study was 400 families of bees of the Apis mellifera carnica breed, bred in the basic farms of the farm "Demidov", "Normukhamedov",

"Mirsidikov", specializing in breeding bees in the Turkestan region. The research was carried out according to the above scheme (Figure 1).

5 male families were selected to calculate the flight of bees, the quantitative composition and determine the effect of feeding male offspring of female bees on the nutritional reflex. The swarm of bee families was determined by the time of the construction of the swarm Queen's dormitories, their number and location in the hive, the strength of the family and the state of its hive during the construction of the swarm Queen's dormitories, the installation of generally accepted practices according to the instructions of beekeeping [17].

Instrumental insemination was carried out in accordance with the requirements of the methodology "artificial insemination of Queen Bees" [18].

When assessing the winter hardiness of bees, a population-statistical method was used. The assessment of the productivity, behavior of bee families in the apiary was carried out according to the generally accepted methodology for conducting research work in beekeeping [19].

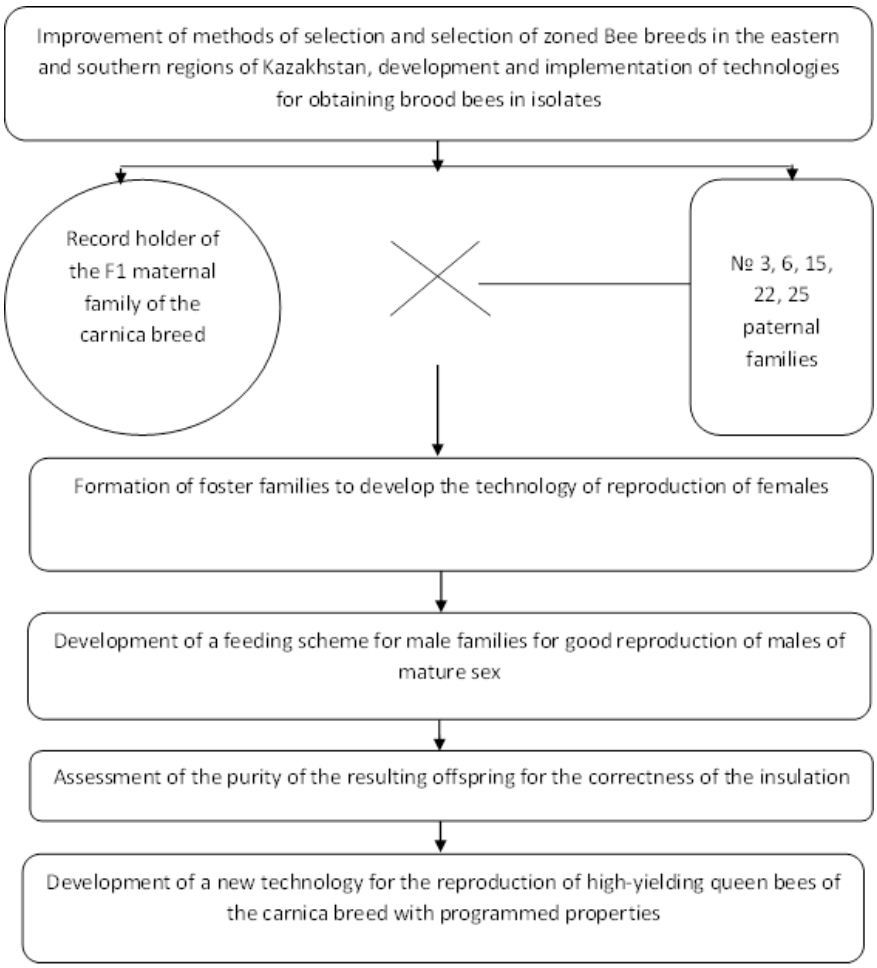

Figure 1-Research Scheme

Laboratory tests include the determination of external signs: the length of the beak, the width of the third tergite, the cubic indicator, The Shape of the wax mirror. "Instructions for assessing the breeding value and reproduction of bees", approved by the order of the Minister of Agriculture of the Republic of Kazakhstan dated October 10, 2014 No. 3-3/517 (annex 15), By order of the Ministry of Agriculture of the Republic of Kazakhstan dated 27.05.2016 No. 239" on amendments and additions to the order of the Minister of Agriculture of the Republic of Kazakhstan "a comprehensive assessment of breeding material was carried out in accordance with the requirements of the Republic of Kazakhstan dated October 10, 2014 No. 3-3/517" on approval of the guidelines for the assessment

of the breed standard of farm animals". The resulting material was processed by the method of variational statistics [20].

Results and discussions. The results of a study of the general condition of honey bees in the main farms showed their favorable condition. In some hives, Bee excitement was recorded, but various sounds of excitement were not recorded (Table 1).

Table 1 – Evaluation of bee families for winter hardiness

Name of the farm	Number of families	2020y. autumn		2021ж. spring		Nest contamination level, score	Number of motherboards, PCs	Winter hardiness, score
		b/cinter-frame space	feed quantity kg	b/cinter-frame space	Amount of remaining feed, kg			
IE "Mirsidikov"	22	8,8±0,22	15,2±0,67	5,8±0,27	7,8±0,16	1	21	18
IE "Normukhamedov"	34	9,1±0,17	16,0±0,67	7,4±0,25	8,5±0,22	-	34	20
IE "Demidov"	32	8,2±0,22	14,8±0,69	6,8±0,26	6,3±0,15	-	32	20

In order to install new nurseries and carry out further vaccinations, 250 mothers were placed in insulators before the release of unfertilized females.

In all bee families, a slight contamination of the hive arrival zone was found. Due to the good preparation for wintering and the organization of top dressing with biologically active anti-nosematosis additives, the indicator of winter hardiness was 18 points in IE "Mirsidikov", IE "Normukhamedov" and IE "Demidov" - 20 points.

Inoculation of larvae was carried out using plastic plates treated with beeswax and diluted mother's milk. For the study, a frame with 12-hour larvae from the female family was taken, which were transferred to bowls prepared using an iron spatula. The results of the reception of maternity wards are presented in Table 2.

Table 2 – The work of receiving plates

Foster family	Total number of plates	Number of accepted plates	Percentage, %
№1	120	102	82
№2	120	97	77

In the family of educator No. 1, 102 or 82% of 120 plates were accepted, in the family No. 2, 97 out of 120 plates were accepted, which was 77%.

To assess the quality of feeding of larvae, measurements of closed ovipositors were carried out and the weight of unfertilized females on the 10th day was determined before replanting to the nucleuses (Table 3).

Table 3 – Volume of the mother's uterus Fed

Foster family	Number of accepted mother's beds, pieces	Maternal uterus, mm	Number of unfertilized females, pieces	Weight of unfertilized females, mg
№1	97	30,7±0,78	92	200,2±1,52
№2	102	29,2±1,11	95	198,5±2,01

The results of the assessment of the size of the Fed mother's uterus showed that in Family No. 1 the number of accepted mother's uterus was 97 pieces and the average size was 30.7±0.78 mm. and if the number of mothers in Family No. 2 is more than 102 pieces, the size was 29.2±1.11 mm, which is 1.5% lower than the average indicators of Family No. 1. Caregiver No. 1 - in the family, a high weight of an unfertilized female was observed-200.2 ± 1.52 mg.due to the fact that the female uterus was raised less here, the feeding bees intensively filled the plates with royal jelly, and the larvae, having received a large amount of food, increased in size and at the exit, the unfertilized female had a higher weight.The selection of unfertilized queen bees was carried out according to phenotypic and genetic characteristics. This made it possible to choose the best individuals in terms of the mass and size of their abdominal cavity, the number of oviducts, since these indicators are closely related to the reproduction of females, the development and productivity of families.To obtain high-quality sperm females, 60 healthy, undamaged bees weighing more than 190 mg were selected from 199 unfertilized young females.It was found that while the quality of females is largely determined by the conditions of their breeding and feeding in the caregiver-family, the highest live weight of females is observed in strong caregiver-families with a bee population of different ages. Educator-the stronger the family, the higher the quality of the females (Table 4).

Table 4 – Caregiver-weight of females depending on the family

Foster family	Educator-live weight of the family, kg	Number of unfertilized females, pieces	Live weight of the female, mg
№1	2,5	92	198,3±0,20
№2	1,0	95	181,2±0,23

When the first male bees appeared in the apiary, breeding of brood mothers began, and 10 days before that, families were given 200 g of bread with a honey-pollen mixture per day. Bread with a mixture of honey and pollen contributed to an increase in the weight of unfertilized females by 19.3 g compared to families that did not receive additional feed (Table 5).

Table 5 – The effect of feeding foster families with bread with a honey-pollen mixture on the size of the uterus and the weight of the females

State of feeding families	Maternal weight, mg	
	Unfertilized	Fertilized
During the period of daily feeding with bread with a honey-pollen mixture (n=92)	199,8±1,96	221,6±1,64
Families left without feeding (n=95)	180,5±2,03	210,0±1,52

Unfertilized females were planted in micronucleus, for better perception of females, young worker bees were separated from the family 3 days before replanting and placed in a dark, cool place. Thus, 100% of unfertilized young females in micronucleus, which were taken to an isolated aviary, were accepted.

The main factor for replanting fertilized females is the number and age of the bees, the physiological state, and the quality of the replanted queen bee. The results of studies on the use of various methods of replanting fertilized females in full families have shown that it is much easier to plant a new female in small families in conditions of intensive growth than in strong ones, and young flightless bees practically do not show aggressiveness to replanted females.

Table 6 – Different ways to plant a fertilized female in full-fledged families

Different ways	Number of fertilized females, pieces		Percentage, %
	planted	accepted	
Cage	20	17	85
Mesh cap	20	14	70
Edge insulator	20	16	80

For each of the ways of planting fertilized females considered, it was successful with the presence of some advantages. The advantage of replanting fertilized females in a cage is that even with an aggressive attitude towards it, bees cannot kill it. However, this means that adult bees of the family, planted in a mesh cap, cannot pass into the queen bee, it can only be surrounded by the youngest bees from the hive, which allows for the presence of many free hives to produce eggs. planting using a fringed insulator had the same advantages as using a mesh cap. According to the results of our research, the most effective way to replant fertilized females was to replant their fertilized females in a cage, which guarantees a successful reception of 85%.

The influence of the weight of females on their reproduction depends on many factors, which are determined by the external and internal conditions of the life of a group of bees. Only a large female can lay a lot of large eggs, from which large offspring develop and energetic bees appear. It works intensively in honey harvesting, accumulates a large amount of honey, provides high-quality care for the larvae, produces a large amount of Mother's milk and has good winter hardiness.

Table 7 – Number of ovum tubes of a fertilized female (n=20)

Indications	Lim	M±m	C_v,%
Weight of an unfertilized female, mg	186-205	198,4±2,06	17,4
Weight of the fertilized female, mg	198-228	220,2±2,92	17,9
Number of egg tubes, PCs	308-362	348,7±1,35	19,5

The results of studies to determine the number of oviducts of a fertilized female showed that the average weight of unfertilized females was 198.4±2.06 mg, fertilized-220.2±2.92 mg. The filling of the seminal ducts of females averages 21.8 mg, the average number of oviducts in fertilized females is 348.7±1.35 pieces. The conducted research allows farms to recommend that bees be selected according to such characteristics as weight, abdominal volume, number of oviducts, which are closely related to the reproduction of females, the development and productivity of the Bee breed.

Conclusion. At the basic farms of IE" Mirsidikov", IE" Normukhamedov "and IE" Demidov", studies of the state of honey bees were carried out and further selection methods were determined. The results of studies on the organization of larval inoculation by means of plastic plates showed that the number of females accepted in Family No. 1 is 97 pieces, and the average size is 30.7±0.78 mm. The maximum accepted number of mothers in Family No. 2 was 102 pieces, the size of which was 29.2±1.11 mm, which is 1.5% lower than the average for Family No. 1. Caregiver No. 1 - in the family, a high weight of an unfertilized female was observed-200.2±1.52 mg.due to the fact that the female uterus was raised less here, the feeding bees intensively filled the plates with mother's milk, and the larvae, having received a large amount of food, increased in size and at the exit, the unfertilized female had a higher weight.

The most effective way to put unfertilized females in a cage was to replant fetal females in their womb, guaranteeing a successful intake of 85%. The average weight of unfertilized females is 198.4±2.06 mg, fertilized females are 220.2±2.92 mg, and the average number of oviducts in fertilized females is 348.7±1.35 pieces. The results of the studies carried out make it possible to propose a selection based on such characteristics as weight, abdominal volume, number of ovules, which are closely related to the reproduction of females, the development and productivity of bees.

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РЕЗЮМЕ

Проведено исследование по разработке методов селекции, улучшения продуктивных и воспроизводительных качеств пчелиных маток. Изучены прием и размеры вскормленных маточников, зависимость массы маток от массы семьи-воспитательницы, влияние медово-перговой подкормки семей-воспитательниц на объем маточников и массу маток, а также различные способы подсадки в полноценные семьи. Установлено, что при меньшем воспитании маточников, пчелы кормилицы усиленно наполняют мисочки маточным молочком, при этом личинки, получающие большое количество корма увеличиваются в размерах и при выходе вес неплодной матки увеличивается. Качество маток определяется во многом от условий их выращивания и кормления в семьях-воспитательницах, при этом было определено, что наибольшая живая масса матки наблюдается в сильных семьях-воспитательницах с разновозрастным составом пчел. Чем сильнее была семья-воспитательница, тем выше было качество маток. Наиболее эффективным способом подсадки плодных маток явилось подсадка плодных маток в клеточке, гарантирующий успешный 85%-ный прием. При использовании различных способов подсадки плодных маток в полноценные семьи показали, что в небольшие

семьи, находящиеся в состоянии интенсивного роста, гораздо легче подсадить новую матку, чем в сильные, при этом молодые нелетные пчелы практически не проявляют агрессивности по отношению подсаживаемой матке.

ТҮЙІН

Ара аналықтарының селекциясын және өнімді қасиеттерін жақсарту, өсіру әдістерін әзірлеу бойынша зерттеу жүргізілді. Қоректенетін аналық жатынлардың мөлшері мен қабылдануы, аналықтың салмағы тәрбиеші-отбасы салмағына тәуелділігі, балды-балтозаң мен қоректенуінің аналық жатынлардың көлеміне және салмағына әсері, сондай-ақ толыққанды отбасыларға қайта отырғызудың әртүрлі әдістері зерттелді. Анықталғандай, аналық жатынлардың аз тәрбиесімен азықтандырушы аралар тостағандарды аналық сүтімен қарқынды түрде толтырады, ал көп мөлшерде азықтанатын дернәсілдер көлемі ұлғаяды және шығу кезеңінде ұрықтанбаған аналықтың салмағы артады. Аналық араның сапасы көбінесе тәрбиеші-отбасыларын өсіру және азықтандыру жағдайларымен анықталады, ал аналықтың ең жоғары салмағы әртүрлі жастағы аралар құрамына енетін тәрбиеші-отбасында байқалатыны анықталды. Тәрбиеші-отбасы неғұрлым күшті болса, соғұрлым аналықтың сапасы жоғары болады. Ұрықтанған аналықты шығарудың 85%-ға қабылдауына кепілдік беретін ең тиімді әдісі, торшаға қайта отырғызу. Ұрықтанған аналықтарды толыққанды отбасыларға қайта отырғызудың әртүрлі әдістерін қолданғанда, жас аналық аралар іс жүзінде қарқынды өсу жағдайы шағын отбасыларға отырғызу әлде қайда оңай екендігі көрсетілді.

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