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BREEDING MALE BEES FOR ARTIFICIAL INSEMINATION OF QUEEN BEES IN THE CONDITIONS OF UZBEKISTAN

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ABSTRACT

The article contains information on ways of raising male bees for artificial insemination of queen bees, quality indicators of male bees, changes in sperm fluid, color, quantity, and age. The control group was fed only with sugar syrup (1-1 ratio) in the early spring and was given every other day by 250 mg. Unlike other breeding animals, queen bees mate with several male bees in their lifetime and reproduce. Male bees meet only one queen bee and die. Fertilized queen bees are the successors of the female and male offsprings. When breeding male bees of a certain age, we placed bee frames with male bee offspring in special isolators, and upon their maturation, one-day weight was measured on electronic field scales and painted in special frames.

KEYWORDS: *Male Bees, Sperm Fluid, Condensation, Sexual Vagina, Electronic Scale, Syringe, Infectious, Genetic, Information, Isolator, Carpathian Breed*

INTRODUCTION

Today, a number of positive activities are being carried out in Uzbekistan in branches of agriculture like development of beekeeping, which is considered its main field. In particular, the decision of the President of the Republic of Uzbekistan dated October 16, 2017 "On measures to further develop the beekeeping network in our republic" No. 3327, which is the legal basis for the sustainable development of the beekeeping industry, is of great practical importance in this regard. [1] Based on this decision, the beekeeping network began to develop rapidly, and the number of bee families exceeded 907 thousand by the end of 2020. And family productivity is improving ecologically. For this purpose, in the conditions of Uzbekistan, it is appropriate to raise a large number of queen bees and conduct their artificial insemination.

In our republic, as queen bees are bred naturally, they breed in the open space with several male bees of foreign breeds, and the pure breed of bees is not preserved.

The aim of the research: to develop the technology of growing male bees for the purpose of artificial insemination of queen bees in the conditions of Uzbekistan.

Research tasks: raising male bees for artificial insemination of queen bees. Studying the health of cultivated male bees, changes in their sperm fluid depending on their age.

Research results: Breeding tomorrow's male bees in the bee family, the male bees, like the queen bees, play an incomparable role in the organization of the genetic structure of the family. That is why it is important to keep them in the family.

Male bees play an important role in the bee family. In particular, the presence of tomorrows male bees is of great importance in breeding farms that raise queen bees in our republic. Fertilization of queen bees in such farms requires a large number of male bees. Artificial insemination of queen bees is being carried out for the first time in our republic.

Place and methods of research- In 2020, artificial insemination of queen bees in the beekeeping farm of the limited liability company Trans Nam Bat Service in the city of Namangan organized the simplest and most common methods of breeding tomorrows male bees.

During the research period, since autumn season 20 bee families with the best performance were selected and divided into two groups of 10, experimental and control groups.

From December to March, bee families in the experimental group were given 0.5 kg of candy (a pasty food with added sugar flour, honey and vitamins) for additional nutrition. The control group was not given an additional food.

In the first days of March, the number of frames in all experimental families was reduced, the beehive was well warmed, and the feeding of the bees was started.

In the middle part of the bee families in the experimental group, two beehives with many male bee cells were placed, and such families were considered as breeding families for raising male bees. In the early spring, the control group was fed only with sugar syrup (1-1 ratio) along with solutio (1liter of sugar juice- 0.4) "Multimax" premix was given every other day by 250 mg.

The control group was fed only with sugar syrup (1-1 ratio) in the early spring and was given every other day by 250 mg. The control group was not given an additional food.

The results of the study: control and experimental male bee-rearing families were first monitored on the first day of March, and then every 14 days (male bee maturation occurs in 14 days) monitoring of male bee generation was carried out continuously. The breeding periods of male bees in the experimental and control groups are shown in Table 1 below.

TABLE 1. NUMBER OF MALE BEES IN REARING FAMILIES (ON AVERAGE PER 1 BEE FAMILY)

No.	Group	The number of reared male bees					Total reared male Bee generation	In % account
		March	April	May	June	July		
1	Control group	140	198	264	298	240	1140	171,4
2	Experiment group	309	518	880	1004	741	3452	239,8

From the data in Table 1, it can be seen that the production of male bees in the experimental group matured 14 days earlier than in the control group, and in March-August, that is, for six months, each family raised 3452 male bees, or this is 239.8% more than the families in the control group.

The same situation can be seen in table 2 below, the dynamics of growth of male bee offspring in bee families.

The quality of the male bees was measured by measuring the weight of the bees on an electronic field scale that accurately measures monthly in one day after they came out of the cages. Table 2 below shows the variation in average live weight of male bees over the year.

TABLE 2. THE VARIATION IN AVERAGE LIVE WEIGHT OF MALE BEES OVER THE YEAR.

Groups	Measured time	N	lim	M±m
Control group	March	10	190-254	227,8±0,04
	April	10	219-274	246,9±0,09
	May	10	209-265	234,7±0,11
	June	10	209-261	231,7±0,21
	July	10	209-261	227,6±0,05
Experiement group	March	10	195-261	233,1±0,19
	April	10	208-298	263,5±0,31
	May	10	209-272	253,7±0,23
	June	10	210-270	251,6±0,18
	July	10	210-269	248,5±0,09

It can be seen from the data on Table 2 that the heaviest weight of male bees in the experimental groups was 263.5±0.31 mg in April, and their weight was significantly reduced (248.5±0.09 mg) in the following months. Even the supplementary feed for rearing families was not sufficiently efficient. The weight of male bees obtained positive results only when reared in April. Thus, it was found that the heaviest male bees were bred in April, in the experimental bee families, 309 in March, 518 in April, 880 in May, and 1004 in June, their weight index was found to vary around respectively 233, 1; 263.5; 253.7; 251.6 mg. In Figure 1 below, you can see the dynamics of changes in the male bee brood of the breeding bee families over the months.

Figure 1 The dynamics of the growth of male honey bee offspring in nurse bee families.

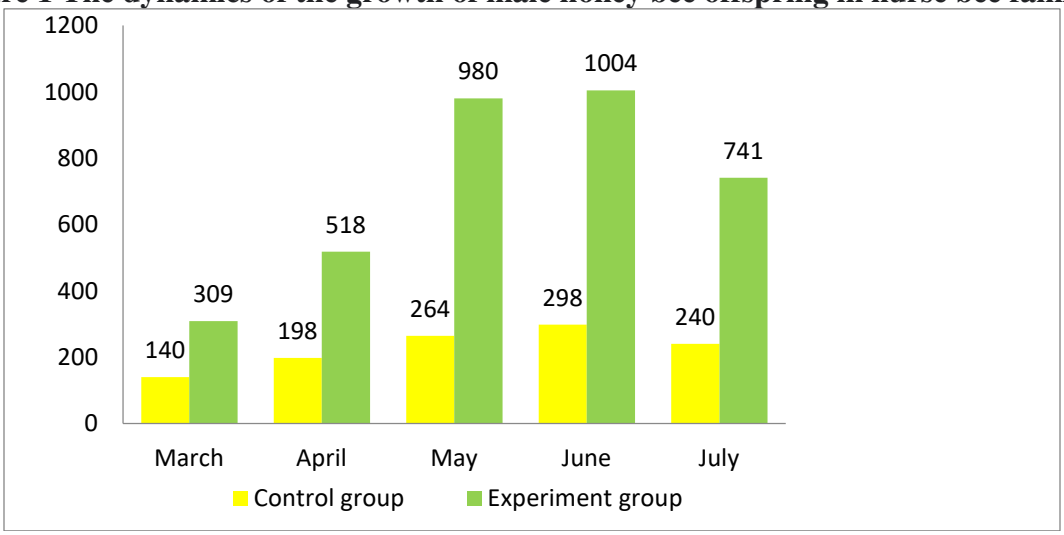

Figure 1 shows data on month-to-month changes in the number of male bees in rearing bee colonies. When the bee colonies in the experiment were fed with protein feeds, 309.0 offsprings

were produced in March, while in the control group it was 140.0, or this indicates that the bee brood in the experimental group was 220.7% more than in the control group.

The offsprings of male bees increased month by month. In particular, by June, 1004 male bees were raised in the experimental groups, while 298.0 male bees were raised in the control group by this period. There were 706 more or 336.4% more in the experimental groups than in the control group.

In July and August, no matter how much protein food we fed to the rearing bee colonies, they did not have any positive effect on the reproduction of male bees.

It can be concluded from the conducted experiments that in order to raise a large number of male bees from early spring, in beekeeping farmers and breeding farms, starting from early spring, each rearing male bee family should be given 1-2 frames with male bee cages and put them in 1 liter of sugar juice. (in 1:1 ratio) it is recommended to supply with "Multimax" feed premix of 0.4 g.

Similarly, male bees suitable for insemination of queen bees were bred artificially and their weight was measured. (Table 3)

TABLE 3

Days	n	lim	M±m	Cv, %
5-7 day weight.	878	231-244	237,5±31,4	31,4
9-10 day weight.	964	239-248	243,5±33,1	29,5
14-15 day weight.	768	233-245	239,0±30,4	30,1

TABLE 3. MALE BEE WEIGHT (MG)

It can be seen from the table that the weight of male bees increased by 6.0 mg compared to the first 5-7 days of age, by 9-10 days, and by 1.5 mg compared to 14-15 days of age. This indicates to male bees that their sperm reserves are increasing as their weight increases. You can see the dynamics of changes in the average live weight of male bees over the months in the diagram below.

Figure 2

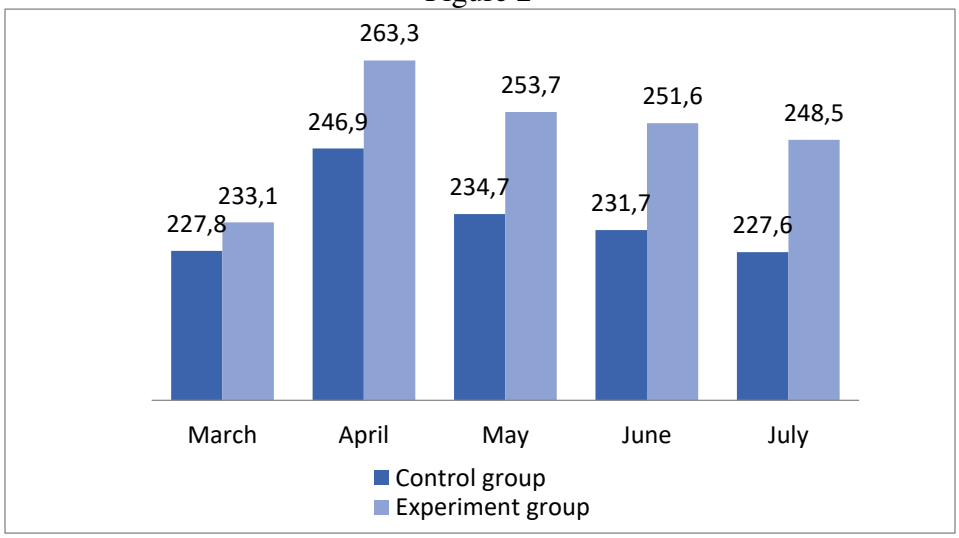

Figure 2. Dynamics of weight change of male bees.

The sperm fluid of 2610 male bees was taken for artificial insemination of 267 queen bees. Also, special attention was paid to the age and appearance of male bees. The amount of sperm fluid in each of the tested male bees was taken using special syringes and measured on field electronic scales, the colour, consistency (density, thickness) of sperm fluid was determined by eye. Information on this is presented in Table 4 below.

TABLE 4. AMOUNT OF SPERM FLUID OF MALE BEES (MG)

Day	n	M±n	Cv, %	Colour	Density
3rd day	10	0,015	15,01	Whitish	Liquid
7th day	15	0,120	17,05	Whitish	Liquid
10th day	20	0,513	20,09	White yellowish	Liquid
15th day	20	0,717	18,011	White yellowish	Liquid
20th day	20	0,860	15,08	Yellowish	Liquid
30th day	30	0,970	16,06	Yellowish	Thick

From the data in Table 4, it can be seen that in all the cultivated male bees, 3-7 days old, the sperm fluid was low, its color was runny and liquid. In the period of 10-15 days, it increased significantly and was around 0.513-0.717 mg. As the age of the male bees increased, the sperm fluid increased and its colour was yellowish, each male bee had 0.800-0.970 mg of sperm fluid, or it was 808.3% more than the 7-day bees. Strict cleanliness and sanitary hygiene rules were strictly followed during the experiment. Because if you deviate a little from these norms, you can infect the mother bees with infectious diseases during the fertilization period.

The role of male bees in the conditions of natural and artificial fertilization of queen bees is very large. Unlike other breeding animals, queen bees mate with several male bees in their lifetime and reproduce. Male bees meet only one queen bee and die. Fertilized queen bees are the successors of the female and male offsprings.

That's why the mother bee is considered a means of transmitting all the genetic information specific to this breed to the whole generation.

For the purpose of conducting the research, we selected bee families with the best performance and all economic useful properties and bred male bees from them.

In the selection of paternal bee families, the work was carried out with strict observance of the selection process, that they are not related to the mother bees. All selected bee families belonged to the Carpathian breed. When breeding male bees of a certain age, we placed bee frames with male bee offspring in special isolators, and upon their maturation, one-day weight was measured on electronic field scales and painted in special frames. In this way, opportunities were created to find them and conduct research with them.

A special room (laboratory) was prepared for the collection of male bee sperm. room temperature was maintained at 25-28^{0}C and air humidity at 80%.

The sperm of the male bee was used to inseminate the queen bee using instruments. To evaluate the sperm of male bees, cream-colored and dark-cream-colored ones are selected. The average sperm fluid of each male bee was around 1.1-1.7 mm^3

The average amount of sperm fluid of one male bee according to age is given in the table below.

TABLE 5. THE SPERM FLUID OF ONE MALE BEE DEPENDING ON THE AGE. AVERAGE VOLUME (MM3)

Age of male bees (day)	Taken male bees (Piece)	Seminal fluid (mm3)		
		lim	M±m	Cv,1
10-16	20	0,8-1,4	1,1	0,15
17-18	23	1,5-1,9	1,7	0,18
20-22	26	1,3-1,7	1,5	0,16

From the data of Table 5, it can be seen that in male bees at the age of 10-16 days, the sperm fluid was around 1.1 mm^3, at the age of 17-18 days, it was around 1.7 mm^3, and at the age of 20-22 days, it was around 1.5 mm^3. In male bees aged 17-18 days, sperm fluid was 0.6 mm^3 and 0.2 mm^3 more than those aged 20-22 days, or it was 154.5% and 113.3% more.

CONCLUSIONS AND RECOMMENDATIONS. For artificial insemination of queen bees, sperm fluid of 12-15 days old male bees was of good quality.

It was found that the sperm fluid of male bees changes depending on his age, and in 30-day-old male bees, it increases significantly, and its color is yellowish and thickened.

It is suggested to feed the breeding male bee families with 250-300 mg of protein food per day from early spring.

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