

STUDY ON THE BEHAVIOR OF ARTIFICIALLY INSEMINATED QUEENS OF *APIS M. CARPATICA* RACE DURING PASSIVE PERIOD

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Abstract

In beekeeping, at present time, mating can be controlled only by applying instrumental insemination techniques of queens or providing special isolated areas (islands, mountain regions). This study aimed to compare the behavior of instrumental inseminated queens to the naturally mated, during passive period (september to april). The lot of queens, artificially inseminated in late summer, were introduced in queen less colonies. Behavior aspects were compared to their sisters, naturally mated queens, which were introduced under appropriate conditions. For each batch where rated most important behavioral indices: acceptance of queens, laying start-up, wintering cluster, early build-up, etc.

Acceptance of instrumental inseminated queens was 75% , wintering of colonies was 90%, with a minimum consumption of food and was observed a intensive cleaning flight.

Keywords: artificial insemination, queens of *A. m. Carpatica* race, queens behavior, natural mating

INTRODUCTION

It is known that the queens are mating in the air with many drones regardless of race or origin(1). For selection purpose, control on the origin of genetic material is vital. Keeping control of queen mating can be done using instrumental insemination techniques or creation of special isolated areas (islands, isolated areas). In Moldova creation of such special areas of mating is difficult, and to have control on queen mating will be used instrumental insemination techniques.

MATERIAL AND METHOD

The research was conducted in the attested breeding apiary in Hîrtopul Mic, Republic of Moldova. The material used in our research it belong to *Apis mellifera carpatica* race, which comes from the same apiary. Formed in specific conditions of climate, relief and flora of our country. Taking into account that the purpose of experiments was aimed to compare the instrumentally inseminated queens behavior(2) to those mated naturally in passive period, the insemination was done in the first week of September. The semen were collected from over 200 drones with the help

of drone collectors. Semen was collected using special syringe(3). For instrumental insemination process were used 8 queens at age of 10 days, obtained by artificial queen rearing methods. Insemination was made by classic methodology technique using the Latshaw's device(4). Queens were prepared for instrumental insemination process, so that they could make a cleaning flight and later being anesthetized with CO₂. Queens were inseminated with 4μl of semen.

After insemination, queens were marked and placed in individual queen cages, giving them candy, without accompanying bees, after were placed in queen bank. After 48 hours instrumentally inseminated queens have been subjected to the second treatment with CO₂ and were again placed in the queen bank. For a period of three days, artificially inseminated queens, were examined regarding their behavior, also were fed with honey in small quantities.

To introduce the batch of queens, instrumentally inseminated and the naturally mated, who served as witness batch, were prepared nucs, in which were formed 16 new colonies, 8 nucs for instrumentally inseminated queens and 8 for naturally mated

queens. Nucs were created equally on 6 frames of standard horizontal hives, including three frames of the hatching brood with a dominant number of young bees(5), and a feeder. Such nuc prepared for queen introduction were left for 3 days to become queen less, and before to introduce the queen, nucs were inspected if there are natural queen cells.

Instrumentally inseminated queens and naturally mated queens were introduced into the nuc prepared earlier using the indirect method of introduction. In the moment of queen introduction each nuc was feed with 0,5 l, 1:1 sugar syrup(6). During a week the nucs were feed with syrup and given them frames with young brood, to make them all equally.

All nucs were treated against varroa mite twice (in mid-September and late September) and were ready for wintering.

Throughout the experiment was studied the behavior of both, queens and the bees from the nest of colonies, considering the following indices:

- Acceptance of queens, by bees from the nucs;

- Laying star-up of queens;
- Resistance of bees at wintering process(7);
- Early build-up of colonies.

Interpretation of result was made according to husbandry rule regarding evaluation of bee colonies and certification of bee breeding material(8).

RESULTS AND DISCUSSION

To do instrumental insemination during passive period of the year is difficult, primarily because of lack of drones. From nearly 200 drones harvested to collect semen 50% were immature, 20% too mature, while the remaining 30% had very small quantity of semen. Thus queens were inseminated only with half of the normal quantity, recommended quantity is 8 μ l / queen.

There were not being observed abnormal deviations of queen behavior right after insemination and by the time being in the queen banks. None of the inseminated queens died as a result of insemination process. After insemination process queens were active and the bees from the bank were not being aggressive against these queens.

Tabel 1
 Comparative evaluation of the behavior of colonies in new created nucs

Nr. Crt.	Indeces	Queens naturally mated	Queens instrumental inseminated
1	Acceptance of queens, by bees from the nucs %	87,5	75
2	Laying star-up of queens %	28	0
3	Resistance of bees at wintering process %	100	83
4	Early build-up of colonies, %	66	60
5	Honey consumption	Relative-low	Relative-low

When the nucs were checked for natural cells, in 7 of them was found natural cells.

From 8 queens artificially inseminated, 2 queens were killed, and from the naturally mated- one. It is believed that in both cases, queens were killed because of the high aggression of bees in these nucs.

From 13 queen accepted only 2 queens start to laying after four days, after the introduction. None of the artificial inseminated did not began to lay. This can be explained that after a day of placing the

queens in the nucs, air temperature dropped suddenly and followed a period of 10 days with high variation of temperature during day and low night temperatures. During this period in some colonies was observed formation of bee nest, even during the days.

During the observation time in November, December and January was found out that colonies are wintering well, including those 2 families whose queens had started to lay and those 11 colonies who

entered in the wintering season with queens which didn't have a chance to start laying.

During a quick review in early February was identified that one of the 6 families with instrumental inseminated queen died, cause being mice invasion. From 7 families with queens naturally mated none died.

After last data collected at the end of February from 13 families who have prepared for winter only one was lost, the other one wintered well. There was a low consumption of honey, in both cases, in the colonies with instrumentally inseminated queens as well as in those with queens naturally mated. At that time, 3 queens from those instrumentally inseminated and 4 naturally mated began to lay.

CONCLUSIONS

As the result of the research was found out that doing artificial insemination in September is risky because of lack of drones in hives and their inadequate quality, and also that the queens have no sufficient time to start to lay before entering in winter. Also were detected no variation regarding honey consumption in the colonies with instrumentally inseminated queens and those naturally mated. But it was found that

introduction of instrumentally inseminated queens is more difficult and can record high losses if it is not taken into account this specific.

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