EVALUATION OF THE MORPHO-METRIC INDICES OF LOCAL BEES FROM THE QUEEN REPRODUCTION APIARY

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Abstract

The purpose of the research is to evaluate the morphometric indices of local bees, select the most relevant genotypes adaptable to natural conditions and form the brood batch from maternal and paternal families for queen reproduction. It was evaluated that the morphometric indices of worker bees from maternal colonies constitute on average: proboscis length – 6.41 mm, the size between the protrusions of tergite-3 – 4.44 mm, tergite-3 length – 2.13 mm, sternite-3 width – 3.87 mm, sternite-3 length – 2.59 mm, length of the cerci mirrors of sternite-3 – 2.23 mm, width of the cerci mirrors of sternite-3 – 1.50 mm, length of the right greater wing – 8.73 mm, width of the right greater wing – 2.95 mm, cubital index – 34.94%, tarsus length – 1.89 mm, tarsus width – 1.04 mm and positive discoidal dislocation – 82.65% and neutral – 17.35%. Larvae aged 8-12 hours were collected from the maternal colonies for transfer to the queens' reproduction. It was revealed that the amount of honey extracted from a colony of bees using pastoral beehives is 63.3-73.8 kg. It was found that local bees are better adapted and resistant to the Varroa mite than Carpathian bees imported from abroad.

Key words: *local Carpathian bee colonies, morphometric, morpho-productive indices*

INTRODUCTION

The successes of beekeeping depend mostly on the organization and level of development of the breeding base, the technology of raising queens and the exploitation of bees.

Valuable litter material can be quickly reproduced by breeding queens.

The development and productivity of bee families depend greatly on the value of the queens, their quality and genetic potential.

At the same time, the quality of queens is influenced by the growth period, age, status of the nurse family, number of larvae transferred, nectar-pollinating resources, etc. [1, 2, 3, 4].

To assess the bee breed, it is also necessary to study the morpho-metric indices.

The surest criterion for the assessment of purebred bees is their characteristic according to the external indices (measurement of the length of the proboscis, width of the tergit-3, calculation of the ulnar index, assessment of the color class of the bees and discoidal dislocation) [5,6].

The dimensions of the external characters of bees are necessary for systematic study, appreciation of racial affiliation in the process of selection work, and for quality control of individuals [6].

The study of morpho-productive and external characters, as well as the deepening of knowledge about the morphology, wintering resistance and productivity of local bees allow the appreciation of the productive value and provide a good material as a basis for local Carpathian bees, adapted to the conditions of the Republic of Moldova, which is of scientific and practical interest.

As a result of the above, the purpose of the research is to evaluate the morpho-metric

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indices of local bees, to select the most relevant genotypes adaptable to natural conditions and to form the breeding flock from maternal and paternal families for the reproduction of queens.

MATERIAL AND METHOD

To achieve the proposed goal, the colonies of Carpathian bees from the "Albinărie" LLC apiary located in the village of Dănceni, Ialoveni district, served as the object of the research.

The study of the morpho-metric characters of worker bees was carried out according to the methodical indications of beekeeping scientists [1, 3, 7].

For the research and appreciation of the morphometric indices, samples of bees were selected, 20-30 pieces from each family, according to the recommended methods. Samples of worker bees were collected in March and April.

Among the morphometric characters of the worker bees, the following were studied: the length of the trunk, the length of the tendons of the ulnar cell of the large right wing, the dimensions between the protrusions of the tergit-3 and the length of the tergit-3, the length and width of the sternite-3 and of the waxy mirrors, the length and width of the large right wing, the length and width of the tarsus and discoidal dislocation [3, 5].

RESULTS AND DISCUSSION

Based on the results obtained, the breeding batch consisting of maternal and paternal bee families was selected. The study of the morpho-metric indices of the worker bees from the families of the breeding batch consisted of an average: the length of the proboscis is on average 6.35 mm per apiary, the length of the large right wing – 8.79 mm and the width – 2.97 mm, discoidal dislocation: positive – 64.10% and neutral – 35.90%, ulnar index – 34.79%, tarsus length – 2.00 mm and width – 1.06 mm, tergitum length – 3 – 2.09 mm, The size between the protrusions of the tergit-3 is 4.38 mm, the length of the sternite-3 – 2.60 mm and the width – 3.72 mm, the length of the waxy mirrors of the sternite-3 is on average 2.22 mm and the width – 1.50 mm.

It was assessed that the morphometric indices in worker bees from maternal families constitute, on average: the length of the proboscis – 6.41 mm with the variation between 6.21-6.72 mm, size between the protrusions of the tergit-3 – 4.44 mm (4.21-4.69 mm), the length of the tergit-3 – 2.13 mm (2.07-2.22 mm), the width of the sternite-3 – 3.87 mm (3.61-4.55 mm), the length of the sternite-3 – 2.59 mm (2.46-2.76 mm), the length of the waxy mirrors of the sternite-3 – 2.23 mm (2.13-2.43 mm), width of the wax mirrors of the sternite-3 – 1.50 mm (1.41-163 mm), length of the large right wing – 8.73 mm (8.57-8.99 mm), width of the large right wing – 2.95 mm (2.90-2.99 mm), ulnar index – 34.94% (19.4-39.19%), tarsal length – 1.89 mm (1.87-1.91 mm), tarsus width – 1.04 mm (1.0-1.09 mm) and positive discoidal dislocation – 82.65% (77-87%) and neutral – 17.350% (13-33%) (Table 1).

The coefficient of variation of the morphometric indices in worker bees in maternal families oscillated between 1.27% of the length of the large right wing and 29.83% of the ulnar index.

It was revealed that the amount of honey extracted from a family of bees using the pastoral apiary is 63.3-73.8 kg. It has been found that local bees are better adapted and resistant to the Varroa mite than Carpathian bees imported from abroad.

Table 1: Morphometric indices of worker bees in maternal families, mm

Clues	$\overline{X} \pm S\overline{x}$	V (%)	Limit (min.-max.)
Length of the trunk	6.41 ± 0.109	3.40	6.21 – 6.72
Size between the protrusions of the tergit-3	4.44 ± 0.114	5.12	4.21 – 4.69
Length of Sheet-3	2.13 ± 0.034	3.17	2.07 – 2.22
Sternite width-3	3.87 ± 0.226	11.68	3.61 – 4.55
Sternite Length-3	2.59 ± 0.057	4.42	2.46 – 2.76
Length of the wax mirrors of the sternite-3	2.23 ± 0.068	6.08	2.13 – 2.43
Width of the wax mirrors of the sternite-3	1.50 ± 0.046	6.18	1.41 – 1.63
Length of the large right wing	8.73 ± 0.092	2.11	8.57 – 8.99
Width of the large right wing	2.95 ± 0.019	1.27	2.90 – 2.99
Ulnar index	34.94 ± 5.212	29.83	19.45 – 39.19
Length of the tarsus	1.89 ± 0.010	1.09	1.87 – 1.91
Width of the tarsus	1.04 ± 0.019	3.60	1.0 – 1.09
Discoidal dislocation, %	82.65 + 17.35 n	- -	77 – 87+ 13 – 33

CONCLUSIONS

1. It was assessed that the morphometric indices of worker bees in maternal families consist on average: length of the proboscis – 6.41 mm, size between the protrusions of the tergit-3 – 4.44 mm, length of the tergit-3 – 2.13 mm, width of the sternite-3 – 3.87 mm, length of the sternite-3 – 2.59 mm, length of the wax mirrors of the sternite-3 – 2.23 mm, width of the wax mirrors of the sternite – 3 – 1.50 mm, length of the large right wing – 8.73 mm, wide right wing width – 2.95 mm, ulnar index – 34.94%, tarsus length – 1.89 mm, tarsal width – 1.04 mm and positive discoidal dislocation – 82.65% and neutral – 17.350%.

2. It was revealed that the amount of honey extracted from a family of bees using the pastoral apiary is 63.3-73.8 kg.

3. It has been found that local bees are better adapted and resistant to the Varroa mite than Carpathian bees imported from abroad.

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