

MORPHOLOGICAL SIGNS OF BEEBREAD

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The results of morphological and statistical research beebread. Found that beebread granules obtained at the use of artificial comb, developed by at the Department of Apiculture V. A Nestervodskoho named in shape, measurements and mass was better control, but did not differ in structure.

***Key words:** Beebread, granules, shape, measurements, mass*

Due to its nutrient properties a beebread becomes of greater demand. It is the only source of albuminous feed for bees, and thanks to rich chemical composition a beebread is used in the medical and dietary feed of people, which pulls out new requirements to its quality. Beebread got from bee families, thanking to the antimicrobial action of separate connections, can be kept for a long-term period [5, 9]. Chemical composition, nourishing value, medical properties of bee-bread, depend not only on its specific origin but also on technologies of receipt, processing and methods of storage [7, 8].

At the same time, the labour intensiveness and imperfection of methods to get beebread led to the fact that this type of beekeeping products is received on apiaries occasionally and insignificant volumes.

Having regard to the small quantity of researches, which touch technology of receipt, canning and storage of beebread, her morphological estimation, there is a necessity of further study of these questions.

Therefore the purpose of our work touched the study of morphology of beebread at the different methods of receipt.

Materials and methods of researches. Researches conducted during 2011-2013, using generally accepted methods [1-4; 6-9]. For this purpose we took away 20 families on principle of analogues which were distributed into two groups - control and

experienced. The noted families were kept applying the generally accepted technology of supervision. A difference between experimental groups is the method of beebread receipt. So, we put hazel combs in the nests of families of control group. They were placed between nursery and feed part of nests. In the experienced group we used artificial combs, worked out at V.A. Nestervodskogo department of beekeeping. Before establishment comb was treated with wax, and we inflicted a small amount of freshly sampled pollen on the bottom of cells. Like in a control group, artificial combs were put into the experimental families between nursery and feed part of nests. During 5 - 6 days, bees filled cells with pollen. To determine the level of granules formation, withstand combs 6 days more, sections were separated from them and with an interval in two, and then one day their morphological estimation was conducted. The granules of beebread from the sections of combs were taken away on 6, 8, 10, 12, 14, 15 and a 16 day.

Other combs with a beebread, after filling of cells with an albuminous feed by bees, withstand in nests during 15days. At the end of this term combs were taken away from the nests of experimental families. Then they were carried in empty housings, previously designated the date of combs' selection and a number of families on combs overhead. The last mentioned ones were placed above the nests of families, previously being separated from bees housings with a beebread by an isolating lattice. At the end of the season selected and stored combs were transported to the laboratory of V.A. Nestervodskogo department of beekeeping at the National University of Life and Environmental Sciences of Ukraine.

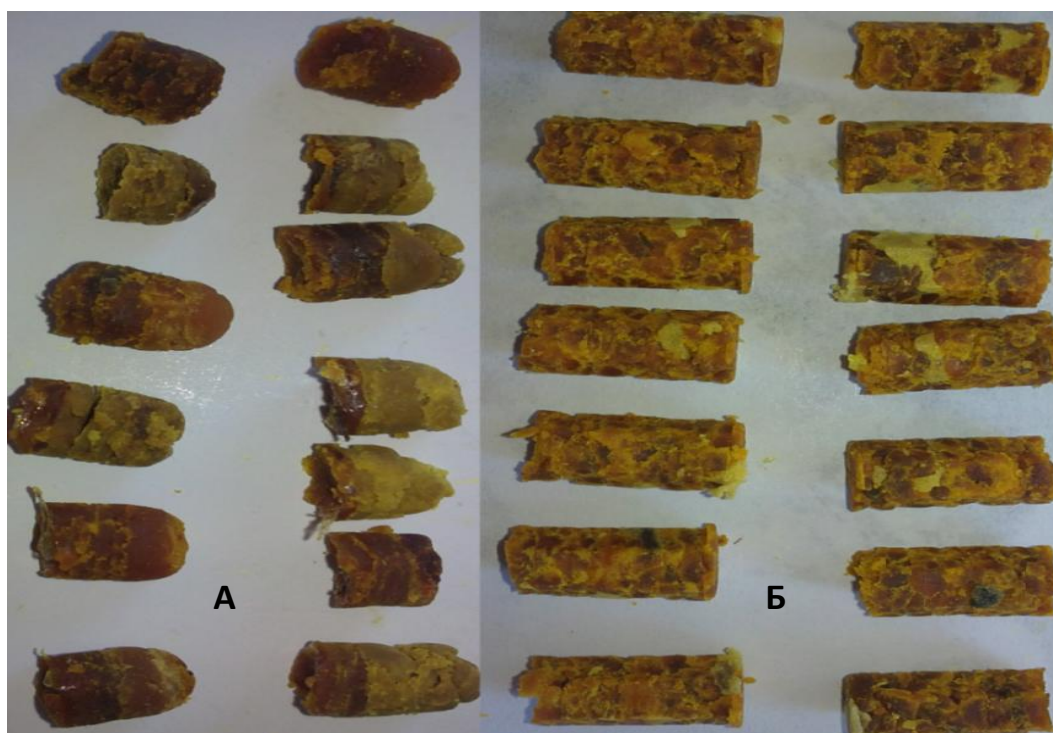
From every combs of control and researched groups we deleted a beebread which was weighed on the trade scales F902H - 15 E (error $2/5$ g). From the beebread which was received from combs we took away the tests of granules, which in future will be used for a morphometric estimation, namely determined the mass of granule, its length and width, degree of formation (dense, loose, crumbly). 100 granules of beebread is assesses on control and researched group at all.

The mass of granule was determined on the scales of BT- 500. For this purpose scales were tared without a granule, and then - with a granule. The length and width of the granule was measured by a ruler with a scale division of 1 mm.

All findings were noted to the log of initial accounting with a purpose of their further biometrical treatment and analysis.

Results of researches. Significant differences in shape, size, weight and structure of granules was found receiving beebread from combs of control and researched groups. Taking into account, that in a control group a beebread was received from bee combs, exactly their quality influenced the marketability of granules. It is known [7], that after geniture of young bees there are bits and pieces of cocoons in the cells of combs, whatever working individuals can't fully delete. Every next shown out generation of bees walls of cells are becoming thicker, more rounded, their hexahedral form is gradually lost, and also a diameter and depth of cells decreases. All of it effects the mass, sizes of beebread granules (see pic. 1).

Using a new technology to receive this variety of products granules are more monotonous, of clear hexagon form, their diameter and height are almost permanent which does a beebread more attractive in a commodity relation.



Pic. 1. The general view of beebread granules which was got by generally accepted method (A) and by newly developed (B)

At confirmation above-mentioned the morphological estimation of beebread granules which was received by generally accepted and by newly developed methods was done . Results over of these researches are brought in tables 1-3.

Table 1. Changes in the beebread structure in the process of protein supplies forming in the nest of bees, n=100

The period when frame with a beebread was in the nest, days	Beebread structure , %		
	loose	middle	dense
6	86	14	–
8	81	19	–
10	73	26	1
12	68	29	3
14	6	45	59
15	–	2	98
16	–	–	100

Over a period of researches we found that after the filling of cells by a pollen, some of its beads easily were separated from general mass, i.e. the granules of beebread scattered. According to this feature we defined that the structure of beebread granules is loose or crumbly. Granules partly scattered on separate particles after being removed from the cells. Mostly there were the separate beads of pollen or groups of beads - two and more in each one. In cases when the beebread granules were partly scattered their structure was classified as semiloose (middle). In the third variant granules had a homogeneous (not crumbly) structure, that is why they were defined as dense (pic. 2).

It is set that after combs keeping for 6 - 8 days, beebread granules mainly had a loose structure. That is granules in 81 and 86 cases scattered and only 14-19 % from their general mass had middle form. In 10 - 12 days, the form of beebread granules has changed. Maybe not substantially, but nevertheless, the amount of scattered granules

decreased at first to 73, and then to 68 %. At the same time, the amount of middle structure granules increased and there were several samples that didn't scatter.



A

B

C

Pic. 2. Formedness of beebread granules
A - dense; B - middle; C - loose

In day 14 about 6% of granules in general mass of the products that was taken from the section had a loose structure, and 49 and 59 % beebreads - middle and dense. Starting from a day 15 and further a beebread structure was dense.

On authority of foregoing analysis it can be confirmed that beebread granules from artificial combs is possible to obtain only after 15 day's storage| in the nests of families after filling of bee protein feed stock supplies. Probably in the period of protein feed supplies creation there are complicated biochemical processes in pollen which provide the best inoculation of cages.

There is no need in further placing of combs in the nests of families as bees start to consume the reprocessed product actively and it reduces the productivity of families in beebread production.

It is set that the beebread granules which were taken from the cells of bee combs (control group) mainly had a cone-shape form that was narrowed at the basis. They had a dense structure with the distinct layers of pollen of different types of plants. These layers of pollen were different in thickness and had a zigzag form. In the layers of pollen of one type there was often a layer of another type. It is caused by migration of the flora that common for bees in the harvesting period. Bees can visit 2-4 types of plants at the same time while working in the field. Especially it can be noticed in returning of bees from the field when they bring the pollen of different color. At the

time of beebread formation this pollen gets the cells and after a compression turns into layers in granules.

Table 2. Estimation of beebread quality on morphological signs, n=100

Index	Control				Research			
	length, mm	width, mm	mass, mg	structure	length, mm	width, mm	mass, mg	structure
M±of m	6,12± 0,141	4,12± 0,036	149,49± 2,726	dense	9,54± 0,293	4,99± 0,025	255,94± 8,021	dense
Lim	1-10	4-6	40-238		1-14	4-6	41-367	
Cv, %	22,98	8,65	18,24		30,68	5,03	31,34	
td	–	–	–		10,55	19,86	12,57	

Granules of beebread which were withdrawn from the cells of artificial combs had the clearly expressed hexahedral form and had a structure and density of pollen bedding identical to control. There were some divergences in length and width among beebread granules which were withdrawn from the cells of waxen (control) and artificial combs. In a control group middle length of granules was a 6,1 mm (3,4 mm less than researched variant). Percentagewise this difference is 55,9 % in favor of research ($P<0,01$).

The width of beebread granules that was received in families of control group was on 0,87 mm less comparatively with the researched variant (in a percent equivalent this difference was 21,1% ($P<0,001$)).

In relation to mass of beebread granule the researched group had more substantial advantages above the control group. A difference on this index was 71,2 % or almost 106,5 mg ($P<0,01$).

Conclusions

Thus on the basis of the conducted researches of beebread granules morphology, determination of their mass set the following. Beebread granules from families of control and researched groups weren't different in structure. At the same time certain divergences in the form of granules were found. The beebread granules in a control group didn't have homogeneity, mostly their form was rounded and narrowed at the basis. In researched samples beebread granules had the clearly defined hexahedral form and in measures of length, width and mass prevailed control group with a high reliable difference($P < 0,01$).

The noted researches can be used in the development of industrial technology to receive beebread and estimation of its quality.

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МОРФОЛОГИЧЕСКИЕ ПРИЗНАКИ ПЕРГИ

В.Д. Броварский, С.Н. Величко, А.Й. Колесник

Приведены результаты морфологических и статистических исследований перги. Установлено, что гранулы перги, полученные при использовании искусственных сот, разработанных на кафедре пчеловодства им. В.А. Нестерводского по форме, промерам и массе были лучше контроля, но не отличались по структуре.

Ключевые слова: Перга, гранулы, форма, промеры, масса

МОРФОЛОГІЧНІ ОЗНАКИ ПЕРГИ

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Наведено результати морфологічних та статистичних досліджень перги. Встановлено, що гранули перги, одержані при використанні штучних стільників, розроблених на кафедрі бджільництва ім. В.А. Нестерводського за формою і промірами та масою переважали контроль, але не відрізнялись за структурою.

Ключові слова: Перга, гранули, форма, проміри, маса