

THE EFFECT OF ALGAL SUSPENSION "CLORELLA VULGARIS" USING IN ARTIFICIAL RAISING OF QUEENS

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Abstract

Obtaining of bees products depends on the conditions of maintenance of bees' families, organization of breeding work, selection, the honey and the quality of queens obtained from specialized apiary. The goal of the research was to determine the influence of using the algal suspension "Clorella Vulgaris" in acceptance larvae inoculating for queens rearing, length, diameter and mass of queen - cells, and mass of mated or none mated queens. There had been noted that using of algal suspension "Clorella Vulgaris" with sugar in the diet of queens nurse family, contributes the queen - cells development, influencing the mass, length and diameter of queen - cells. During the active season for lack of natural harvesting (nectar, pollen), is beneficial to use algal suspension "Clorella Vulgaris" to supplement biological mixture of sugar 1:1, the amount of one liter per nurses family nutrition, from the moment of larvae inoculation to capped queen - cells (5 days).

Key words: algal suspension, bees, beehives, food, honey, queen - cell, queens sugar, syrup

INTRODUCTION

The main task of beekeeping is to ensure food of high nutritional and biological value. Obtaining of bees products depends on the conditions of maintenance of bee families, organization of breeding work, selection, the honey and the quality of bee queens obtained from specialized apiary.

Bees collect from flowers of the plants nectar and pollen, which process in food - honey and bee bread. Bees' food contains all needed vital nutrients - protein, lipids, carbohydrates, minerals, vitamins [5].

For bee family life processes is required a considerable amount of food - honey and bee bread. Strong family during the year consumes 90 kg honey during winter rest - about 10 kg, while in the active vital periods- spring, summer and autumn - about 80 kg (to maintain life of adult individuals, larvae feeding, wax secretion, energy consumption during flight, nectar processing in honey).

At queens rearing are formed the following groups of families: mother, father, started,

nurses (growing), families incubators, helpful, care and production families [1, 2].

In cases when the reserve amount of family food is insufficient, the bees must be fed. For growth of juveniles is using sugar syrup in a concentration of 50% (1 kg sugar 1 liter water) [6].

After 6 hours after orphanizing there is introduced in the nanny family frames with artificial queen - cells with inoculated larvae and it is administrated sugar syrup to stimulate the adoption of a large number of larvae [3].

Nescubo p.m., Crahotin N.F., Rogova V: A. [7] – fed the bees in the experimental group with hlorela paste mixed with sugar syrup. Daily each bee family received 300-350 g of nutrient mixture. Analogue the same amount of sugar syrup, not containing added, there was to the families in the control group: one part water and one part sugar. Over 12-15 days in experimental families, was noted an increase of juveniles increased compared to control families, fed with sugar syrup without biological supplement.

According to the authors, clorella can be used for increasing family nutrition, the production

of bee venom and royal jelly, selection improving and bees work. The study of the influence of algal suspension at artificially raise of queens has also scientific and practical interest.

Using clorella suspension as additional food for bees significantly expand up the opportunities of bee family increases the queens' prolificacy and bees activity, increase their immunity and disease resistance [4].

Based on the presented research goal is to determine the influence of algal suspension "Clorella Vulgaris" at acceptance larvae transfuse for queen growing, length, diameter and mass of queen - cells mass of pared and not pared and queens.

MATERIAL AND METHOD

To fulfill the decided objectives, the object of investigations had served the bees families of the Carpathian breed from apiary "Albinarie", Ialoveni, Republic of Moldova.

To study the influence of algal suspension "Clorella Vulgaris" at acceptance of inoculated larvae for queens rearing, the length, width and weight of lidded queen - cells also the mass of pared and not pared queens were formed 3 groups of growing bees families.

The first group growing families received one liter of sugar syrup (1:1);

Group II - were additionally supplied and worked with reserves of their honey;

Group III - received a liter of algal suspension "Clorella Vulgaris" with sugar 1:1.

Bess families of group I and III were respectively fed using one liter of solution, when the larvae were inoculated than daily till capped queens - cells (during 5 days).

Data were processed by statistical variation method, after Mercurieva E. [8] N. Plohinschii [9] and using computer programs Microsoft Excel.

RESULTS AND DISCUSSIONS

Research has shown that the first series of experiments, at 16 June growing families, had each 9-11 combs in the nest and power was 8-

10 areas between populated of honeycombs with bees. Growing bee families had received each 1.0 liter of syrup and there were each inoculated by 30 larvae (Table 1).

Of the total number of accepted inoculated larvae had accepted bees queen rearing 20-25 larvae, or from 66.7 to 83.3%.

Raised queen - cells in families that were fed with algal suspension with sugar had the mass of 1.12 mg or by 0.42 mg higher which is 160.0%, longer by 0.33 cm ($B \geq 0.999$) that is 114.2% and diameter 1.31 cm or higher by 0.14 cm ($B \geq 0.99$) which is 112.0% compared with control group I. The extremities of queen - cells in group III were between 2.3 and 3.0 cm and diameter - 1.2 to 1.5 cm (table 2).

In determining the weight of not pared queens there was not found significant differences between groups, averaging between 182.56 and 200.67 mg (Table 3). Coefficient of variation of this index was 5.88 and 10.56%.

The mass of mated queens was on average 247.5 mg in group III (with minimum 236, maximum 253) in group I - 249.5 mg (range 247-252) and in group II - 229.0 mg (209 and 244.0) (Table 4).

Coefficient of variation of body weight in experimental group was 2.0% and in group I control - 1.42% and in second control - 7.87%.

In the second series of experiments starting from July 16, growing families had 11 to 12 combs in the nest and the power of 10 areas of honeycombs populated by bees. Growing families were fed with 1.01 l of syrup each in groups I and III during 5 days and also were inoculated every 30-35 larvae per family.

Experiments conducted on 16.06.2011 - 16.07.2011 were repeated.

The result shows that nurses' family had accepted to raise queens growing in group I, 19 in group II - 22 and in group III - 18 inoculated larvae (Table 5), constituting 54.3% respectively in batches, 64, 7% and 60,0%.

At evaluation of capped queen - cells on July 26, was found that their mass formed in group I - 1.0 g in group II - 1.05 g and in the experimental group with application of algal suspensions Clorella Vulgaris - 1.14 g (Table 6).

Table 1. Influence of algal suspension on inoculated larvae acceptance (16. 06. 2011)

Group	Nr. of honey combs in the nest, pieces	Power of growing family, between frames space	Quantity of administrated syrup, l	Number of inoculated larvae	Nr. of accepted larvae	
					number	%
I – Syrop 1:1	11	10	1,0	30	25	83,3
II – Honey	9	8	-	30	20	66,7
III – Algal suspension + sugar 1:1	10	9	1,0	30	20	66,7

Table 2. Influence of algal suspension on length, diameter and mass of queen - cells (26. 06. 2011)

Group	Nr. of queen - cells	Index	X ± Sx	V, %	Limits	Index in % compared to the control
I – Sugar syrup 1:1	25	Mass, g	0,7 ± 0,50	35,71	0,5 – 1,0	100
		Length, cm	2,32 ± 0,020**	4,31	2,2 – 2,6	100
		diameter, cm	1,17 ± 0,015	6,41	1,1 – 1,4	100
II – Honey	20	Mass, g	0,60 ± 0,046	34,20	0,5 – 1,0	85,7
		Length, cm	2,21 ± 0,032	6,43	2,0 – 2,5	95,2
		diameter, cm	1,18 ± 0,011	4,13	1,1 – 1,3	100,9
III – Algal suspension + sugar 1:1	20	Mass, g	1,12 ± 0,17**	21,46	0,5 – 1,5	160,0
		Length, cm	2,65 ± 0,005***	0,27	2,3 – 3,0	114,2
		diameter, cm	1,31 ± 0,040**	4,32	1,2 – 1,5	112,0

The significance between the differences: ** B≥0,99; *** B≥0,999

Table 3. Body mass of not pated queens, mg (29. 06. 2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I – Honey syrup 1:1	6	200,67 ± 6,302	7,69	174 - 217
II – Honey	9	182,56 ± 6,425	10,56	165 - 212
III – Algal suspension + honey 1:1	27	182,83 ± 0,37	5,88	158 - 208

Table 4. Body mass of pated queens, mg (16. 07. 2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I – Honey syrup 1:1	2	249,5 ± 2,50	1,42	247 – 252
II – Honey	3	229,0 ± 10,408	7,87	209 – 244
III – Algal suspension + honey 1:1	5	247,5 ± 3,50	2,00	236 – 253

Table 5. Influence of algal suspension at inoculated larvae acceptance (16. 07. 2011)

Group	Nr. combs in nest	Power of growing family, between frames space	Quantity of administrated syrup, l	Number of inoculated larvae	Nr. accepted larvae	
					number	%
I – honey syrup +water 1:1	12	10	1,0	35	19	54,3
II – Honey	11	10	-	34	22	64,7
III – Algal suspension + honey 1:1	11	10	1,0	30	18	60,0

Table 6. Influence of algal suspension on the length, width and mass of queen - cells (26. 07. 2011)

Group	Nr. of queen - cells	Index	X ± Sx	V, %	Limits
I – Syrup (honey +water) 1:1	18	Mass, g	1,0 ± 0,021	8,99	0,89 – 1,2
		Length, cm	2,57 ± 0,036*	5,93	2,3 – 2,9
		Diameter, cm	1,22 ± 0,015	5,08	1,1 – 1,4
II – Honey	8	Mass, g	1,05 ± 0,040	10,82	0,9 – 1,22
		Length, cm	2,67 ± 0,025	2,64	2,7 – 2,8
		Diameter, cm	1,22 ± 0,025	5,77	1,1 – 1,3
III – Algal suspension+honey 1:1	17	Mass, g	1,14 ± 0,016*	5,62	1,03 – 1,24
		Length, cm	2,84 ± 0,026***	3,73	2,6 – 3,0
		Diameter, cm	1,31 ± 0,016**	5,04	1,2 – 1,4

The significance between the differences: ** B≥0,99; *** B≥0,999

Table 7. Body weight of not mated queens' mg (29. 07. 2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I – Syrup (honey +water) 1:1	16	175,69 ± 2,12	4,82	157 - 186
II – Honey	8	180,37 ± 4,91	7,70	159 - 199
III – Algal suspension+honey 1:1	17	178,87 ± 2,01	4,64	166 - 204

Table 8. Body weight of mated queen's mg (05.08.2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I – Syrup (honey +water) 1:1	4	223,67 ± 19,18	17,15	181 – 270
II – Honey	-	-	-	-
III – Algal suspension+honey1:1	5	232,4 ± 5,45	5,25	219 – 252

Best queen – cells were grown in group III, which families have been fed during the larval stage of algal suspension, their mass being 0.09 g higher than in control group II ($B \geq 0.95$). Also queen – cells of group III were by 0.17 cm longer ($B \geq 0.999$) and diameter of - 0.09 cm ($B \geq 0.99$).

The coefficient of variation of mass of queen - cells was 5.62% in the experimental group, 8.99% in group I and 10.82% in group II. Respective coefficient of variation of queen - cells length was 3.73, 5.93 and 2.64%, and the diameter of 5.04, 5.08 and 5.77%.

Body mass of not mated queens on July 29 had the average in group I - 175.69 mg, in group II - 180.37 mg and the experimental - 178.87 mg (Table 7). The coefficient of variation respectively 4.82, 7.70, 4.64%.

Body mass of mated queens was established in August 5 223.67 mg (group I) and 232.4 mg (experimental group III) difference 3.9% (inauthentic), (Table 8).

Coefficient of variation of body mass of mated queens in group I was 17.15%, and of the queens of group III only 5.25%.

CONCLUSIONS

1. Use of algal suspension "Clorella Vulgaris" with sugar in the feeding of queens' family nurse increased the better developing of queen - cells, influencing the mass, length and diameter of the queen - cells.

2. During the active season for lack of natural harvesting (nectar, pollen), is beneficial to use algal suspension "Clorella Vulgaris" as a biological supplement 1:1 mixture of sugar, the amount of one liter per family for nurses family nutrition, from the moment of larvae inoculation to queen – cells capping (5 days).

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