

USE OF ADDITIVE IN BEE FEEDING AT QUEENS' GROWING

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Abstract

For vital processes bee family needs a considerable amount of food - honey and bee bread. In cases when the family food supply is insufficient, the bees must be fed additionally. The purpose of research is to determine the influence of the use of feed additives in bees feeding in queens growth. There was found that the optimum dose of the feed additive Premix Bionorm P (Symbiotic complex) used to feed bee queen is 150 mg/l of sugar syrup. Feeding is performed daily in the calculation of mixing 1 l per a bee family beginning with the introduction of the frame with transferred larvae till the queen-cell capping for 5 days. It was found that the use of the feed additive (symbiotic complex) in the diet ensures larvae adoption in growth of bee queens with 15,3-25,7%, compared with the control groups I and II, the queen-cell mass increased with 60,0-110,0 mg or with 5,7-11%, the length – 0,1-0,2 cm or with 3,7-7,8%, the diameter – 0,03 cm or with 2,5%, the body weight of unmated queens - with 1,94-6,62 mg or with 1,1-3,8% and mated queens with 20,86-26,19 mg or with 9,1-11,7%.

Keywords: *bee's families, feed additive, honey bees, sugar syrup.*

INTRODUCTION

Bees collect nectar and pollen on flowers of plants and process into food - honey and bee bread. Bee feed contains all vital nutrients - proteins, lipids, carbohydrates, minerals, vitamins (Буренин, Котова, 1977).

Bee family needs a considerable amount of food - honey and bee bread for vital processes. In cases the family food supply is insufficient, the bees must be fed additionally.

It is known the method of bees feeding using sugar as honey substitute. For growth of juvenile sugar syrup is used in a concentration of 50% (1 kg of sugar in 1 l of water). At reproduction apiaries in queens growth, bee families were twice a day fed with sugar syrup using small doses (Кривцов et al., 2000; Eremia, 2009).

There were inserted the frames with transferred larvae in bee families after 6 hours of orphaning and there was given sugar syrup 50% to nurse families (Mărghițaș, 2005).

Based on the above research goal is to determine the influence of the use of feed additives in the queen bee diet at their growth.

MATERIALS AND METHODS

To achieve the objectives of the research, the bee families of Carpathian breed from apiary

„Albinărie”, Straseni district, Republic of Moldova served as an object of the investigations.

To determine the optimal conditions for realization of queens growing method there was studied the influence of the feed additive Premix Bionorm P (symbiotic complex) on stimulating of larvae adoption, bees feeding, increasing of the length, diameter and cells mass, mass of unmated and mated queens. There were formed 5 groups of nurse bee families, including 2 as control groups and 3 experimental that received sugar syrup with feed additive.

Bee nurse families were formed by orphanizing (the queen and all capped brood were removed, depriving it of the opportunity to bring out a new queen in their larva). There were fixed by 30-35 started queen cells on tapping frame and there was transferred by a young larva at the age of 9-12 hours in each by taking it from native family. After 6 hours of bee families orphanizing in the centre of nurse bee families was introduced a frame of transferred brood.

Syrup was prepared as follows for feeding of bee families: the water has warmed up to boiling, then the sugar was added in a ratio 1:1 to 1 liter of water one kg of sugar, the solution was stirred until the sugar was completely dissolved. When the syrup was cooled to 30°C

there was added a feed additive, which was dissolved in 80-100 ml of water and stirred together.

Nurse bee families in group I (control I) had used the nest honey reserves without supplementary feeding. Nurse bee families in group II (control II) had daily received 1.0 l of pure sugar syrup. Nurse bee families in the experimental group III had received 1.0 l of sugar syrup with 100 mg of feed additive. Nurse bee families in the experimental group IV had received 1.0 l of sugar syrup with 150 mg of feed additive. Nurse bee families in the experimental group V had received 1.0 l of sugar syrup with 200 mg of feed additive.

The experimental families were daily fed from the time of placing of growing frame with transferred larvae to the time of queen cell capping (during 5 days).

To determine the influence of the used feed additives in bee feeding at queens growth there was appreciated the number of transferred adopted queens' larvae, mass, queen cell length

and diameter, mass of not mated and mated queens.

The data obtained were processed by means of statistical variations after Mercurieva, 1970; Plohinschii, 1971, using computer programs Microsoft Excel.

RESULTS AND DISCUSSIONS

The results of the research showed that beginning from 16th of July, there were 8-12 combs in the nest and the power was 7-10 spaces between the frames with populated bees. The nurse bee families had received by one frame with 30-35 transferred larvae.

It was found that nurses bee families in the control I and II from transferred larvae (34-35 pcs.) had adopted from 19 to 22 pcs. or from 54.3 to 64.7% (Table 1).

Nurse bee families that received syrup with feed additive, 100-150 mg/l had accepted 21-24 larvae from 30-32 or 65.6 to 80%. The best results had the experimental group IV, that adopted transferred larvae from 15.3 to 25.7% compare to the control groups I and II.

Table 1. Influence of feed additive on the adoption of transferred larvae in queen's growth (16.07.2011)

Group	Number of combs in the nest	Family power, streets	Quantity of used syrup, L	Number of transferred larvae	Adopted larvae	
					number	%
I. Honey (control I)	11	10	-	34	22	64.7
II. Pure sugar syrup (control II)	12	10	1.0	35	19	54.3
III. Sugar syrup + feed additive, 100 mg/l	8	7	1.0	32	21	65.6
IV. Sugar syrup + feed additive, 150 mg/l	12	8	1.0	30	24	80.0
V. Sugar syrup + feed additive, 200 mg/l	9	8	1.0	30	16	53.3

Table 2. Influence of feed additive on weight, length and queen cells diameter (26.07.2011)

Lotul	Nr. of queen cells	Index	X ± Sx	V, %	Limits
I. Honey (control I)	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
II. Pure sugar syrup (control II)	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
III. Sugar syrup + feed additive, 100 mg/l	21	Mass, g	1.04 ± 0.019	8.38	0.98 – 1.27
		Length, cm	2.57 ± 0.020	3.54	2.4 – 2.8
		Diameter, cm	1.23 ± 0.014	4.10	1.2 – 1.3
IV. Sugar syrup + feed additive, 150 mg/l	24	Mass, g	1.11 ± 0.019***	9.40	0.88 – 1.21
		Length, cm	2.77 ± 0.024***	4.66	2.3 – 2.8
		Diameter, cm	1.25 ± 0.008	3.40	1.2 – 1.3
V. Sugar syrup + feed additive, 200 mg/l	2	Mass, g	0.94 ± 0.045	6.73	0.9 – 0.99
		Length, cm	2.7 ± 0.100	5.24	2.6 – 2.8
		Diameter, cm	1.2 ± 0.00	0.0	1.2 – 1.2

Note: The significance of differences between averages is authentic: *** B ≥ 0.999

At queen cell evaluation on July 26, there was found in the control groups that the weight

ranged between 1.0 and 1.05 g, length 2.57-2.67 cm and diameter 1.22 cm (Table 2).

The mass of queen cells obtained in the experimental group IV was from 60.0 to 110.0 mg or from 5.7 to 11% higher than in control groups I and II (***) $B \geq 0.999$, the length was 0.1 - 0.2 cm (***) $B \geq 0.999$ or from 3.7 to 7.8% and diameter was 0.03 cm or with 2.5% higher.

The body mass of not mated queens on July 29 in the control groups averaged from 175.69 to 180.37 mg, limits ranging from 157 mg to 199

mg. In experimental groups the queens mass was on average of 174.62 to 182.31 mg with a variation between 153 and 202 mg (Table 3).

The best developing had the queens in group IV, that were fed with syrup and feed additive, 150 mg/l with an average of body weight of 182.31 mg, or from 1.94 to 6.62 mg higher than in control groups I and II (* $B \geq 0.95$) or from 1.1 to 3.8% .

Table 3. Influence of feed additive (symbiotic complex) on not mated queens body mass (29.07.2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I. Honey (control I)	8	180.37 ± 4.91	7.70	159 - 199
II. Pure sugar syrup (control II)	16	175.69 ± 2.12	4.82	157 - 186
III. Sugar syrup + feed additive, 100 mg/l	19	174.62 ± 2.52	6.30	153 - 196
IV. Sugar syrup + feed additive, 150 mg/l	23	182.31 ± 2.33*	6.13	159 - 202
V. Sugar syrup + feed additive, 200 mg/l	1	176.0 ± 0.00	0.00	176

The significance of differences between averages: * $B \geq 0.95$

The maximum coefficient of variation of body weight of not mated queens was 7.70%. The body weight of mated queens on 5th of August averaged between 223.67 mg (group I) and 249.86 mg (group IV). The queens of group IV, that received feed additive with syrup, 150

mg/l, had higher body mass from 20.86 to 26.19 mg than control groups I and II or from 9.1 to 11, 7%. The biological potential of body weight of not mated queens was 270 mg. The coefficient of variation was from 5.25 to 17.15% (Table 4).

Table 4. Body mass of unmated queens (05.08.2011)

Group	Nr. of queens	X ± Sx	V, %	Limits
I. Honey (control I)	3	229.0 ± 10.408	7.87	209 - 244
II. Pure sugar syrup (control II)	4	223.67 ± 19.18	17.15	181 - 270
III. Sugar syrup + feed additive, 100 mg/l	4	244.0 ± 7.29	5.98	216 - 249
IV. Sugar syrup + feed additive, 150 mg/l	7	249.86 ± 6.37	7.03	219 - 270
V. Sugar syrup + feed additive, 200 mg/l	1	243.0 ± 0.00	-	-

Therefore, the use of feed additives in the bee family feeding at queen growth ensures adoption of transferred larvae, increases the mass of queen cells, length and diameter, body weight of not mated and mated queens.

CONCLUSIONS

1. It was found that the optimum dose of the feed additive Premix Bionorm P (symbiotic complex) used to feed bee queens during growth is 150 mg/l of sugar syrup. Feeding is performed daily in the calculation of mixing 1 liter per a bee family, beginning with the introduction of the transferred frame with larvae to the queen cells capping during 5 days.
2. It was revealed that the use of the feed additive (symbiotic complex) in bee feeding of growing queen ensures the adoption of transferred larvae in queens growth from 15.3

to 25.7%, compared with the control groups I and II, increases the queen cells mass 60.0–110.0 mg, that is higher with 5.7-11%, the length - 0.1-0.2 cm or higher with 3.7-7.8%, diameter – 0,03 cm or 2,5%, body mass of not mated queen - 1.94-6.62 mg or higher with 1.1 to 3.8%, and body mass of mated queen was 20.86 to 26.19 mg or higher with 9.1-11.7%.

REFERENCES

- Eremia N., 2009. Apicultura. Chişinău, 350 p.
 Mărghitaş L., 2005. Albinele și produsele lor. București. Editura Ceres, 389 p.
 Буренин Н.Л., Котова Г.Н., 1977. Справочник по пчеловодству. Москва: Колос, 366 с.
 Кривцов Н.И., Лебедев В.И., Туников Г.М., 2000. Пчеловодство. Москва: Колос, 398 с.
 Меркурьева Е.К., 1970. Биометрия в селекции и генетике сельскохозяйственных животных. М: Колос, 312 с.
 Плохинский Н.А., 1971. Руководство по биометрии для зоотехников. М.: Колос, 259 с.