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USING FEED ADDITIVE (COMPLEX SYMBIOTIC) IN STIMULATING FEEDING OF BEES

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Abstract

Honey bees use as food nectar, honey, and pollen and bee bread. They collect nectar and pollen on flowers, that process in food-honey and bee bread. Food provides bees body with energy due to carbohydrates, proteins, enzymes, lipids, vitamins, minerals. One of the methods by which it is possible to increase growth and productivity of bee families is early stimulating nutrition. The purpose of research is to use feed additive Premix Bionorm P (symbiotic complex) in bees′ development. It was found that the optimal dose of feed additive Premix Bionorm P (symbiotic complex) is 100 mg / l sugar syrup administered in spring time to boost bee families using one liter over every 10-12 days, beginning with the first days of April until early harvest of white acacia. It was found that the use of feed additive (symbiotic complex) in the nutrition of bees′ families stimulates increasing power of families from 29.2 to 39%, queens′ prolificacy and capped juvenile with 41.9 to 50.2%. It is reasonable the stimulation of bee families in the spring when there is no natural harvest, which ensures honey increase production by 43.2%.

Key words: *bee′s families stimulates, feed additive, honey bees, sugar syrup.*

INTRODUCTION

Honey bees use as food nectar, honey, pollen and bee bread. They collect nectar and pollen on flowers, that process in food - honey and bee bread. Food provides the bees body with energy due to carbohydrates, proteins, enzymes, lipids, vitamins, minerals.

Bee's family needs a considerable amount of food - honey and bee bread for vital processes. Strong family during the year consumes 90 kg honey during the winter rest - about 10 kg and during active vital period - spring, summer and autumn - about 80 kg (for life maintaining of adult individuals, feeding larvae, wax secretion, energy consumption during the flight and processing nectar in honey).

In cases where family amount of food reserve is insufficient, bees must be fed. For juvenile growth stimulation there is using sugar syrup with concentration of 50% (1 kg sugar 1 liter water) (Eremia, 2009; Буренин et al., 1977; Кривцов, et al., 2000).

When artificial supplement was tested in production circumstances it showed its superiority over sugar syrup used as a nutrition stimulant, what increases the growth of juveniles in the absence of harvest during the preparation of bee families for main harvesting (Билаш, 2000).

One of the methods by which it is possible to increase growth and productivity of bees' families is early stimulating nutrition.

The purpose of research is to use feed additive Premix Bionorm P (symbiotic complex) in bees' development.

MATERIALS AND METHODS

To achieve the aim of the experiments, as an object of investigations served bees families, of Carpathian breed from apiary 'Albinarie' Straseni district, Republic of Moldova.

There were formed six groups of bees' families to study the influence of feed additive Premix Bionorm P (symbiotic complex) on growth, development and productivity of bees' families. Bees' families of I control group I had developed during spring time using honey reserves of the nest without additional feeding, the bees families of control group II-II were given one liter of pure sugar syrup , bees' families of experimental group III were administered every 1 liter of sugar syrup and feed additive 1:1 (symbiotic complex) Premix Bionorm P by 50 mg feed additive, group IV - correspondingly 100 mg / l of syrup, group V - 150 mg / l of syrup, group VI - 200 mg / l of syrup.

Bees' families were fed on 22.04.11, 05.07.11, 19.05.11 using one litre of syrup.
The syrup was prepared as follows: Water was heated until boiling, and then the sugar had been added in a 1:1 ratio to 1 liter of water with one kilogram of sugar, the solution was stirred until the sugar was completely dissolved. When the syrup had cooled to a temperature of 30 C there was added feed additive (symbiotic complex), which was dissolved in 80-100 ml of water and was stirred together.
To determine the influence of feed additive on growth and productivity of bees' families during the active season the bees' families control was made over every 12 days until main harvest of white acacia.
There were studied productive characteristics of the bees' families such as: strength, number of capped juveniles and honey productivity.
The data obtained were processed by statistical variation method after Меркурьева, 1970; Плохинский, 1971 and using computer programs Microsoft Excel.

RESULTS AND DISCUSSIONS

The results of the research have shown at the time of experimental groups forming (01/04/2011) the bees family power was from 6.0 to 6.67 areas between honeycombs populated with bees.
While testing bees families on 22.04.2011, it was found that the strength of families varied from 6.33 (group II) and 7.67 areas between honeycombs populated with bees (group VI) (Table 1). There was found in bees nest from 63.33 hundred of capped cells (group II) to 83.67 (group VI), and food reserve ranged on average from 2.0 kg (group I) and 6,67 kg of honey (group V).

Table 1. The status of bees′ families on 22. 04. 2011

Group	The power of bees families, areas between populated honeycombs	Capped juveniles, hundred cells	Honey, kg
I. Honey (control I)	6.67 ± 0.667	77.33 ± 10.651	2.0 ± 0.577
II. Sugar syrup (control II)	6.33 ± 0.882	63. 33 ± 4.702	4.0 ± 1.000
III. Sugar syrup + feed additive (symbiotic complex), 50 mg/l de syrup	6.97 ± 0.465	79.57 ± 8.347	3.24 ± 0.432
IV Sugar syrup + feed additive (symbiotic complex)., 100 mg/l of syrup	7.00 ± 0.001	80.00 ± 12.342	2.67 ± 0.667
V. Sugar syrup + feed additive (symbiotic complex), 150 mg/l of syrup	7.00 ± 0.527	68.67 ± 11.289	6.67 ± 0.888*
VI. Sugar syrup + feed additive (symbiotic complex), 200 mg/l of syrup	7.67 ± 0.33	83.67 ± 13.383	6.0 ± 1.00*

Next control on 07/05/2011 there was found that the best had developed bees families what received syrup feed additive (symbiotic complex). Compared with the control group (I) bees families in groups III-VI had higher strength with 1.0 to 2.34 spaces between honeycombs populated with bees and those that received sugar syrup-0.34 spaces between honeycombs populated with bees (Table 2).
The highest number of capped juveniles was found in bees families that received feed additive (symbiotic complex) 100 mg / l of syrup-191.33 hundred cells, or with 59 hundred cells more than the control group (II).
At the control made on 19.05.2011 at the beginning of the main harvest of white acacia there was found that families of group IV had increased their power and it was on average of 13.33 spaces between combs populated with bees or higher with 26.9-37.8% than in control groups I and II (figure 1).
The maximum number of capped brood was in bees′ families of group IV-199.33 hundred cells, with 41.9 hundred cells more than the control group I and respectively 66.66- in II control group, or with 41.9-50.2% more than those in both control groups (Table 3).

Table 2. The status of bees′ families on 7. 05. 2011

Group	The power of bees families, areas between populated honeycombs	Capped juveniles, hundred cells	Honey, kg
I. Honey (control I)	8.33 ± 1.453	152.67 ± 26.235	2.67 ± 0.333
II. Sugar syrup (control II)	8.67 ± 1.202	132.33 ± 21.835	4.33 ± 0.822
III. Sugar syrup + feed additive (symbiotic complex), 50 mg/l de syrup	9.45 ± 1.324	167.29 ± 5.628	3.89 ± 0.746
IV Sugar syrup + feed additive (symbiotic complex)., 100 mg/l of syrup	10.0 ± 1.000	191.33 ± 6.227	2.0 ± 0.577
V. Sugar syrup + feed additive (symbiotic complex), 150 mg/l of syrup	9.33 ± 0.333	183.00 ± 4.163	5.0 ± 0.577*
VI. Sugar syrup + feed additive (symbiotic complex), 200 mg/l of syrup	10.67 ± 0.882	177.33 ± 8.838	4.33 ± 0.333*

The significance of differences between average: (I-V), (I-VI) *B=0.95

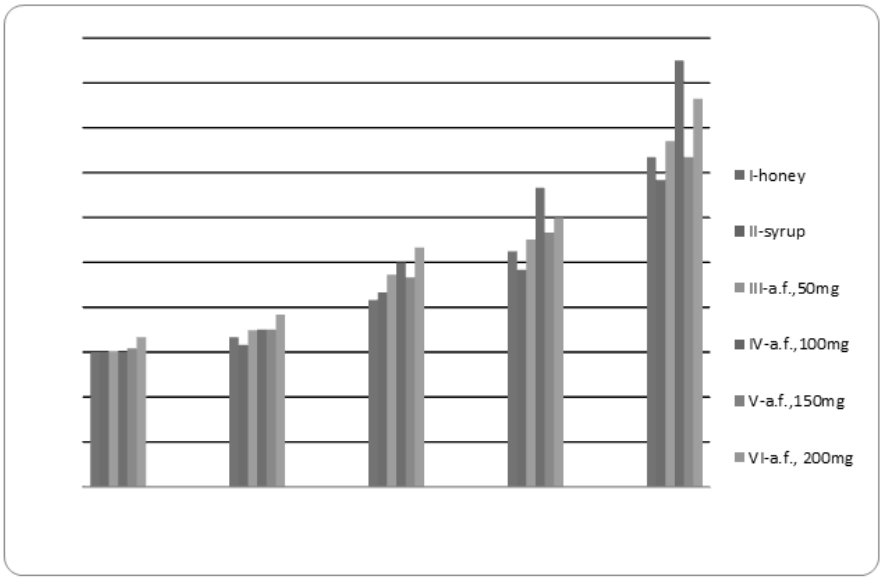

Figure 1. Dynamic of growth of bees′ families′ power, areas between populated honeycomb with bees

Table 3. The status of bees′ families at the beginning of white acacia harvesting (19. 05. 2011)

Group	The power of bees families, areas between populated honeycombs	Capped juveniles, hundred cells	Honey, kg
I. Honey (control I)	10.5 ± 2.500	140.5 ± 13.59	2.00 ± 1.000
II. Sugar syrup (control II)	9.67 ± 1.202	132.67 ± 10.806	3.33 ± 0.667
III. Sugar syrup + feed additive (symbiotic complex), 50 mg/l de syrup	11.02 ± 0.453	155.69 ± 2.637	3.02 ± 0.459
IV Sugar syrup + feed additive (symbiotic complex), 100 mg/l of syrup	13.33 ± 1.856	199.33 ± 12.143*	2.33 ± 1.333
V. Sugar syrup + feed additive (symbiotic complex), 150 mg/l of syrup	11.33 ± 0.333	169.33 ± 1.856*	3.33 ± 0.333
VI. Sugar syrup + feed additive (symbiotic complex), 200 mg/l of syrup	12.0 ± 1.732	173.33 ± 7.965	3.33 ± 0.333

The significance of differences between average: (I-V), (I-VI) *B=0.95

Honey reserve of bee families ranged from 2.0 kg (group I) to 3.33 kg (group II, V and VI), confirming that this time around the apiary, in the useful radius of bees flight was not productive for harvesting of families maintenance and bees had consumed family reserve of honey.

Maximal prolific queens were found in group IV, in this period it was 1661.1 eggs during 24 hours, in group VI-1444, in group V-1411.1 and in group III-1297.4 eggs. In control group I bees families were not additional fed, but bees used honey reserves, and queens prolificity was -1170.8, while those in group II that were fed with pure syrup sugar, their prolificity was-1105.6 eggs during 24 hours, or with 5.6% lower than in control group I.

Queens of the experimental groups had the prolificity with 126.6 (group III)-490.3 (group IV) eggs during 24 hours, or with 10.8 to 41.9% higher than in control group I and with 191.8-555.5 eggs during 24 hours, or with 17.3-50.2% higher than control group II.

Before extracting honey from white acacia (06/08/2011) bees′ families had the power in control groups I and II from 13.67 to 14.7 areas between honeycombs populated with bees. Better development had the bees families of group IV, that received feed additive (symbiotic complex), 100 mg / l of syrup, with an average of power of 19 spaces between honeycombs populated with bees with 4.3 to 5, 33 spaces between combs populated with bees or with 29.3 to 39.0% more than in control groups I and II (Table 4).

Table 4. The status of bees′ families before recolted the honey to 8. 06. 2011

Group	The power of bees families, areas between populated honeycombs	Capped juveniles, hundred cells	Honey, kg
I. Honey (control I)	14.7 ± 4.41	113.3 ± 12.72	24.9 ± 8.396
II. Sugar syrup (control II)	13.67 ± 2.728	139.0 ± 10.693	25.0 ± 2.266
III. Sugar syrup + feed additive (symbiotic complex), 50 mg/l syrup	15.4 ± 3.426	161.4 ± 11.22	29.3 ± 2.523
IV. Sugar syrup + feed additive (symbiotic complex), 100 mg/l syrup	19.0 ± 2.517	182.0 ± 21.794	35.8 ± 4.073
V. Sugar syrup + feed additive (symbiotic complex), 150 mg/l syrup	14.7 ± 0.88	152.7 ± 12.02	28.5 ±4.320
VI. Sugar syrup + feed additive (symbiotic complex), 200 mg/l syrup	17.3 ± 1.45	122.0 ±7.21	34.7 ± 6.570

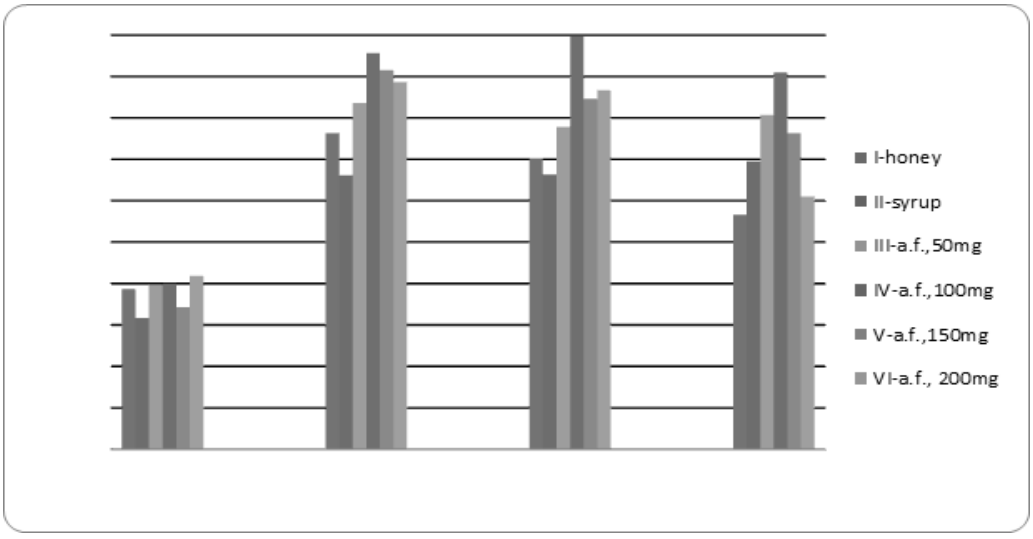

Figure 2. Dynamic of capped juveniles, hundred cells

Increasing the amount of preparation per liter of syrup 150 or 200 mg did not significantly affect the growing power of bees' families.

The highest number of capped juvenile during this period had grown the bees families of group IV-182 hundred cells (Figure 2), or more by 60.6% compared to the control group I and 30.9% compared to control group II.

There had been deposited 24.9-25 kg of honey by bees families of the control groups from White acacia (Figure 3). The maximum amount of honey had stored bees families of group IV, which received feed additive (symbiotic complex), 100 mg / l of syrup-35.8 kg or more by 10.8 kg (43.2%) compared to control group, in group III-29.3 kg, or more by 17.2%, group V-28.5 kg, or more by 14%, in group VI respectively 34.7 kg or more by 38.8% than in the control groups.

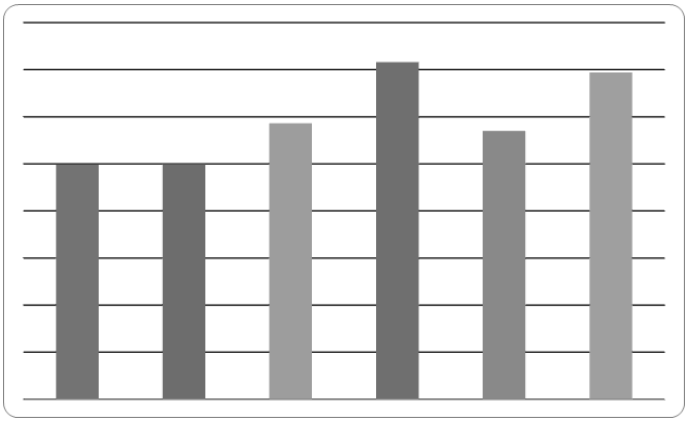

Figure 3. Dynamic of honey storage, kg

During four controls, on 22.04.2011 and until 06.08.2011 bees families in control groups had grew each 467.33-479.8 hundred of capped cells. The highest number of capped juveniles had grew the bees families of group IV-652.66 hundred cells, or more by 39.7% than the control group II and 36.0% than in control group I (Table 5).

Table 5. Number of capped juveniles

Control date	Experimental groups					
	I	II	III	IV	V	VI
22.04.11	73.33	63.33	79.57	80.00	68.170	83.67
7.05.11	152.67	132.33	167.29	191.33	183.00	177.33
19.05.11	140.5	132.67	155.69	199.33	169.33	173.33
8.06.11	113.3	139.00	161.40	182.00	152.70	122.00
Total	**479.8**	**467.33**	**563.95**	**652.66**	**573.20**	**556.33**
±,%	102.7	100.0	120.68	139.70	122.70	119.00

Bees families in group V had grew respectively-573.2 hundred cells, or more by 22.7%, in group VI-556.33 hundred cells, or more by 19.0% than in the control group II. So, using of feed additive (complex symbiotic) in nutrition stimulating of bees during spring time it is possible to increased power, queens' prolificity of bees' families.

CONCLUSIONS

1. It was found that the optimal dose of feed additive Premix Bionorm P (symbiotic complex) is 100 mg / l sugar syrup administered in the spring time to stimulate the bees' families using one liter over every 10-12 days, from the

first days of April until early harvest of white acacia.

2. It was revealed that the use of feed additive (symbiotic complex) in the nutrition of bees' families stimulates the increasing of the family power from 29.3 to 39%, queens' prolificity and capped brood with 41.9 to 50.2%.

3. It is reasonable stimulation of bees' families during spring time when there is no natural harvesting that ensures increasing of honey production by 43.2%.

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TECHNOLOGIES OF THE AGRO FOOD PRODUCTS PROCESSING