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STUDY OF THE INFLUENCE OF STIMULATING FEEDING OF BEES DURING SPRING TIME

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Abstract

In the spring time sometimes Nosema occurs and as a result we have a number of essential losses, such as lots of dead bee families, as well weak families with a small number of bees because of their low resistance. One of the methods by which it is possible to increase growth and productivity of bee families is early stimulating nutrition. The purpose of the investigation is to study the stimulating feeding of bees during spring time with using of probiotic. Using of "Bilaxan" probiotic in bees feeding stimulates increasing of bee families power raised in horizontally hives by 8.29%, queens prolificacy and caped brood with 2.51-31.41% and productivity by 12.24% and respectively in multistage hives with 3.89-5.56%; 8.48-32.45%, and 4.94-12.47%.

Key words: honey bees, probiotics, sugar syrup, bee families.

INTRODUCTION

The main task of apiculture is ensuring food products with superior nutritive and biological values. Mostly, the produced goods depend mainly on the conditions in which the bee families are kept and nurtured and the work organization, selection, and quality of the honey obtained from the apiary specialized queens. The bees collect pollen and nectar from the flowers of plants, which it processes into honey and bee bread. Bees' feed contain all the vital nutritive substances – proteins, lipids, carbohydrates, mineral substances and vitamins (Буренин, et al., 1977). In cases where family food reserve amount is insufficient, bees must be fed. For growth of juvenile sugar syrup is used in a concentration of 50% (1 kg of sugar in 1 L of water) (Кривцов et al., 2000). In the same environmental conditions, with the same growth technology, bee families with equal population achieved different formats in quantitative yields. One of the methods, which can assure the profitability of small and medium hives, is the temporary stimulatory nutrition. By using this nutrition, enhanced egg-laying can be achieved by the laying queen, resulting in increased number of bees and harvested honey from fruit trees and white acacia. For the stimulatory feeding in spring, honey, honey syrup, pollen and sugar syrup can be used (Marghitas, 1997; Marghitas, 2005).

The main function of the bees from the spring generation is focused towards increasing the number of juveniles, in order to assure the maximum number of bees for the main harvesting (Лебедев, 2000). For Carpathian bees it is typical a set of traits for the biological and morphological precious (high prolificacy queens), allowing a short time for the growth of strong and productive families, able to all kinds of harvesting, starting with spring (Малькова et al., 2007). Productivity of bee family is founded in early spring. From this moment the number of eggs laid by the queen in 24 hours must increase every day, due to which the correct amount of food is needed to feed larvae and protein secretion by the royal bee (Маслов, 2007).

For the brood growth stimulation sugar syrup is used, which is usually enriched with vitamins, microelements, floral pollen, bee bread and pine extracts (Ишмуратова et al., 2002).

The utilization of sugar syrup as stimulatory nutrition is fully efficient only when the feed contains protein substances, as the growth of

the juveniles can only happen when there are enough proteins. If there is a lack of proteins in the hive or in nature, then the bees use the protein reserves of their own bodies (Билаш et al., 2002).

It was reported that the prebiotics are significant effects on performance, health, vitality, intestinal ecology and the digestibility observed in many studies, although the mode of action of probiotic is not yet completely explained (Fialho et al., 1998).

Манапов et al. (2009) communicated that lately animal husbandry and veterinary Probiotics are widely used for the prophylaxis of infectious diseases of animals and increase their total resistance. Using probiotics in beekeeping as a feed additive also demonstrated increase in the survival of bees. In the spring, Nosema sometimes occurs and as a result we have a number of essential losses, families of dead bees, weak with few bees due to the low resistance. One of the methods with the help of which it is possible to stop the development and productivity of bee families, is early stimulatory nutrition. The purpose of the investigation is to study the bees feeding stimulants during spring with probiotic use.

MATERIALS AND METHODS

In order to achieve the set objectives, as object for investigations have served hives of Carpathian breed from apiary "Albinărie" maintained horizontally and "Nisporeni" – multi-leveled hives. In order to determine the optimal amount of probiotic per liter of syrup in bee feeding, during spring 5 groups of bee families were formed, including four experimental and one control. Bee families from the experimental group I received 0.5 l of sugar syrup with 50 mg/l "Bilaxan", II - 100 mg/l, III - 150 mg/l , IV - 200 mg/l. Families bee in group V (control I) received 0.5 litres of pure sugar syrup.

The families of bees in the apiary "Albinărie" were fed during spring evenings starting April 19 - 0.5 l sugar syrup to a family every 6 days until the beginning of the main harvest and the apiary "Nisporeni" - one liter of syrup every 12 days. The influence of the "Belaxan" probiotic increases immunity and metabolic normalization process, bees growth, development and productivity of bee families in the spring. During the active season, the checking of bee families was performed every 12 days before the main harvest from the white acacia. From productive characters of bee families were studied: strength, number of capped brood and honey productivity.

The data were processed by means of statistical variations by Меркурьева (1970), Плохинский (1971).

RESULTS AND DISCUSSIONS

The probiotic substances are used for the enhancement of the immune system, recovery normalization of intestinal microflora and metabolic process of the body. As probiotic "Bilaxan" was used - symbiotic feed composed of microorganisms like: strains of *Lactobacillus acidophilus*, *Lactobacillus plantarum*, *Lactobacillus acidophilus bulgaricus* titer of 1x108 CFU/g, *Enterococcus faecium* - 1x107 CFU/g, *Bifidobacterium bifidum* - 1x108 CFU/g - liofilozate cells, antagonistic to pathogenic microflora and pectin, yeast extract, essential phospholipids as natural acidifier.

Research results have shown that during the first spring check (19.04.2013) at the formation of experimental group, families power was 4.7-5.0 spaces between frames populated with bees, capped brood cells were from 64.3 to 80.0 and honey from 4.2 to 8.2 kg (Table 1).

At the control that has been done on 05.01.2013 was found that the strength of families was on average 4.7 to 8.0 spaces between frames populated with bees, capped brood cells was from 96.6 to 136.3 and 4.0-5.3 kg honey. During this period better developed were in group III that was fed with sugar syrup and 150 ml/l "Bilaxan" or with 37.6 hundred cells (td = 2.31) more than in the control group.

It was revealed that prior to the flowering of white acacia (on 13.05.2013) the highest number of capped brood (157.3 hundred cells) was in group III or 31.41% more than in group I (td = 2.66) (Figure. 1). Queens' prolificacy in this group was 1310 eggs in 24 hours and in the experimental group I - 997.5 eggs.

Table 1. Morph-productive indicators of bee families from the LTD „Albinărie" apiary

Groups	Strength, spaces between frames populated with bees	Brood capacity, hundreds cells	Honey, kg
19.04.2013			
I – Sugar Syrup + 50 mg/l „Bilaxan"	5.0±1.00	80.0±18.58	5. 7±1.67
II – Sugar Syrup + 100 mg/l „Bilaxan"	5.0±0.58	67.0±13.43	4.2±0.79
III – Sugar Syrup + 150 mg/l „Bilaxan"	5.0±1.00	65.0±7.94	6.8±2.05
IV – Sugar Syrup + 200 mg/l „Bilaxan"	4.7±0.33	67.0±1.16	8.2±0.81
V – Sugar Syrup pure (witness)	5.0±0.00	64.3±9.20	7.1±0.70
1.05.2013			
I – Sugar Syrup + 50 mg/l „Bilaxan"	6.3±1.33	120.0±23.74	5.0±1.53
II – Sugar Syrup + 100 mg/l „Bilaxan"	8.0±0.58	100.0±18.21	5.3±1.45
III – Sugar Syrup + 150 mg/l „Bilaxan"	7.0±1.16	136.3±13.54	4.33±0.67
IV – Sugar Syrup + 200 mg/l „Bilaxan"	4.7±0.33	109.3±2.333	4.0±1.53
V – Sugar Syrup pure (witness)	7.0±0.00	98.7±9.025	4.0±1.00
13.05.2013 (before the flourish of white acacia)			
I – Sugar Syrup + 50 mg/l „Bilaxan"	7.3±1.33	136.0±31.19	5.3±1.45
II – Sugar Syrup + 100 mg/l „Bilaxan"	9.7±1.20	122.7±22.93	9.3±0.89
III – Sugar Syrup + 150 mg/l „Bilaxan"	9.7±1.20	157.3±11.26	8.3±2.33
IV – Sugar Syrup + 200 mg/l „Bilaxan"	8.3±0.33	141.3±21.80	5.0±0.58
V – Sugar Syrup pure (witness)	9.3±0.33	119. 7±8.51	6.7±0.67
26.05.13 after the harvest from white acacia			
I – Sugar Syrup + 50 mg/l „Bilaxan"	11.67±2.67	132.3±24.85	22.2±6.38
II – Sugar Syrup + 100 mg/l „Bilaxan"	11.33±0.88	97.7±10.20	27.5±1.43
III – Sugar Syrup + 150 mg/l „Bilaxan"	12.67±2.73	131.3±15.25	25.1±4.36
IV – Sugar Syrup + 200 mg/l „Bilaxan"	11.7±1.20	105.0±7.1	22.9±0.35
V – Sugar Syrup pure (witness)	11.7±1.45	127.0±10.9	24.5±0.32

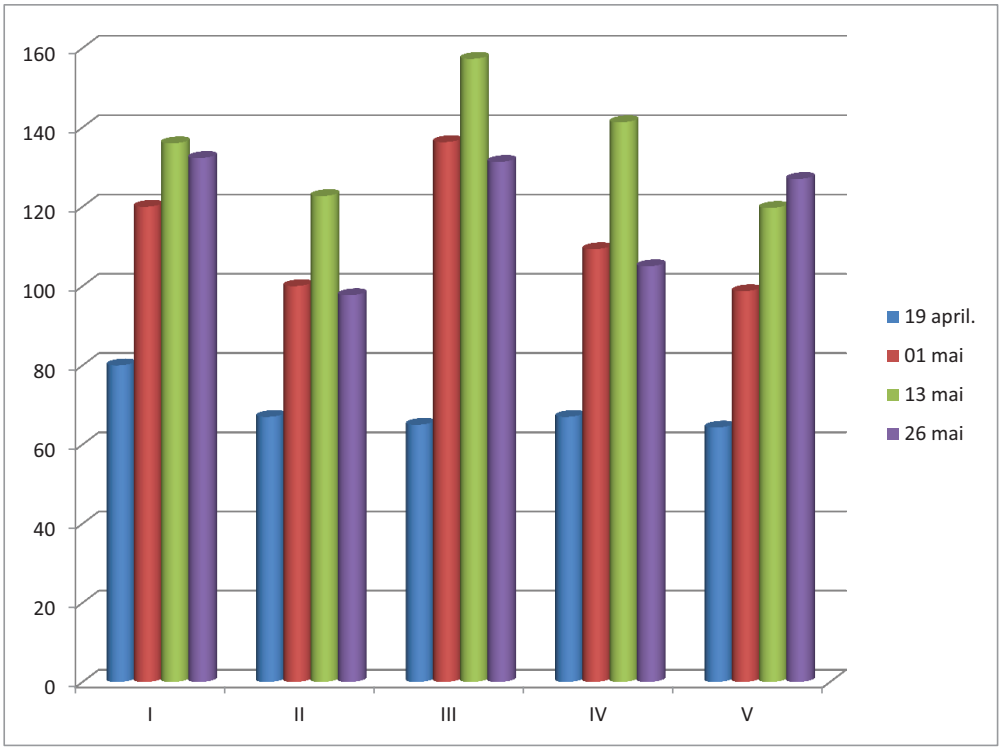

Figure 1. Number of capped brood, hundreds cells

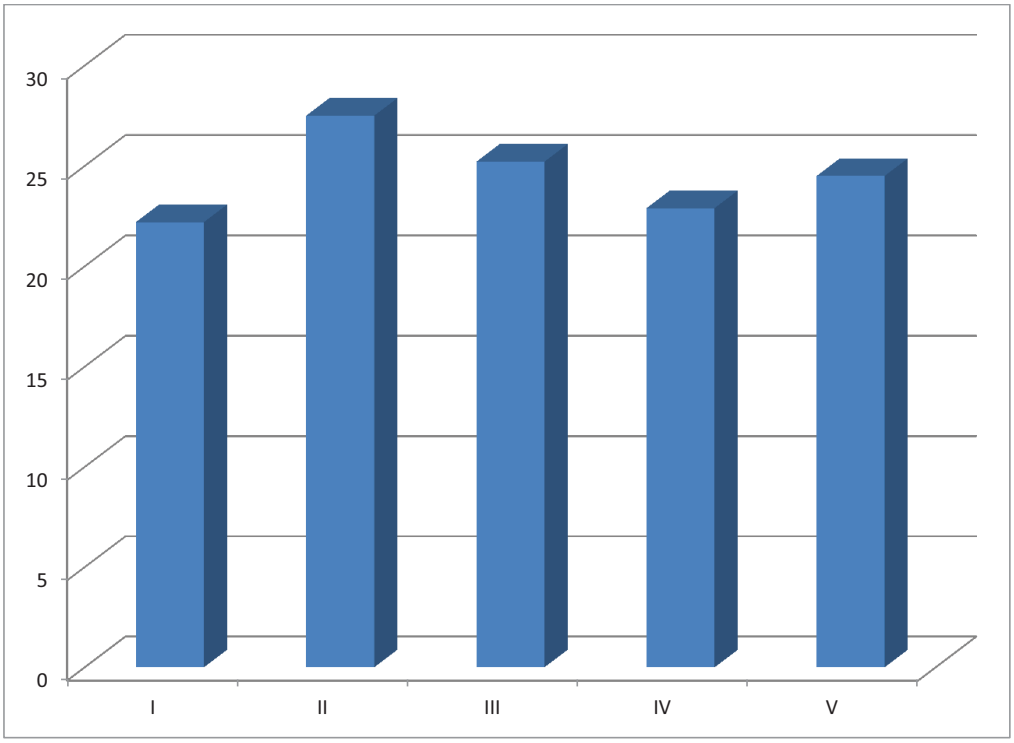

Figure 2. Quantity of collected honey, kg

It was found that after the harvest of white acacia (26/05/2013) the most power had families of group III - 12.67 spaces between frames populated with bees, or 8.29% more than the control group. The maximum amount of honey from the bee families was collected in group II - 27.5 kg or 12.24% more than in the control group (Figure. 2).

In the second experience made with bees families maintained in multistage hives in the apiary "Nisporeni" feeding was done every 12 days using one liter of syrup, starting on 20 of April before the main harvest from the white acacia.

At the moment of groups formation on 20/4/2013, bee families had an average of 7.7-8.0 combs, with power of 6.7 to 7.0 spaces between frames populated with bees, capped brood counted 71.2 -75.0 hundred cells, and the reserve of honey was 2.0-4.0 kg (Table 2).

After 12 days at the next check, there was an increase in the number of capped brood in group II where were administered sugar syrup 100 mg / l "Bilaxan" more with 35.6 hundred cells, or 32.45% compared to the control group (td = 2.16). Also significant increase was noted in group III, which increased 137.7 hundred cells or with 25.52% more than in the control group (td = 2.38).

After harvest of white acacia on 4 of June, 2013 bee families in group II reached spaces between frames populated with bees to 19 or by 5.56% higher than the control group, the family has grown 169.3 hundred cells or by 29.93 % cells more than in the control group (Figure 3). Queens' prolificacy of bee families in group II, in this period was 1 411 eggs in 24 hours, or 326 eggs more than the control group. Bees from the experimental groups stored in an average of 40.4 to 43.3 kg of honey per nest or with 1.9 to 4.8 kg (4.94 to 12.47%) more than in the control group.

Table 2. Morph -productive indicators of bee families from the „Nisporeni" apiary

Groups	Strength, spaces between frames populated with bees	Capped brood, hundreds cell	Honey, kg
20.04.2013			
I – Sugar Syrup + 50 mg/l „Bilaxan"	6.7±0.33	74.0±5.51	4.0±1.15
II – Sugar Syrup + 100 mg/l „Bilaxan"	7.0±0.00	75.0±3.21	2.0±0.58
III – Sugar Syrup + 150 mg/l „Bilaxan"	6.7±0.33	74.0±6.81	2.7±0.67
IV – Sugar Syrup + 200 mg/l „Bilaxan"	7.0±0.00	74.0±6.56	3.3±1.33
V – Sugar Syrup pure (witness)	6.7±0.33	73.67±9.82	3.3±0.88
02.05.2013			
I – Sugar Syrup + 50 mg/l „Bilaxan"	9.0±0.00	134.3±22.24	5.7±0.88
II – Sugar Syrup + 100 mg/l „Bilaxan"	9.3±0.33	145.3±15.94	7.3±0.33
III – Sugar Syrup + 150 mg/l „Bilaxan"	9.0±0.00	137.7±11.05	6.3±1.20
IV – Sugar Syrup + 200 mg/l „Bilaxan"	9.0±0.00	119.0±13.00	6.3±1.20
V – Sugar Syrup pure (witness)	9.0±0.00	109.7±4.05	6.0±1.00
04.06.2013 after the harvest from white acacia			
I – Sugar Syrup + 50 mg/l „Bilaxan"	19.0±0.00	135.0±0.00	40.7±1.12
II – Sugar Syrup + 100 mg/l „Bilaxan"	19.0±0.00	169.3±35.36	41.0±4.84
III – Sugar Syrup + 150 mg/l „Bilaxan"	18.7±0.33	132.0±24.01	43.3±5.34
IV – Sugar Syrup + 200 mg/l „Bilaxan"	18.7±0.33	139.0±26.96	40.4±2.51
V – Sugar Syrup pure (witness)	18.0±1.00	130.3±14.44	38.5±1.21

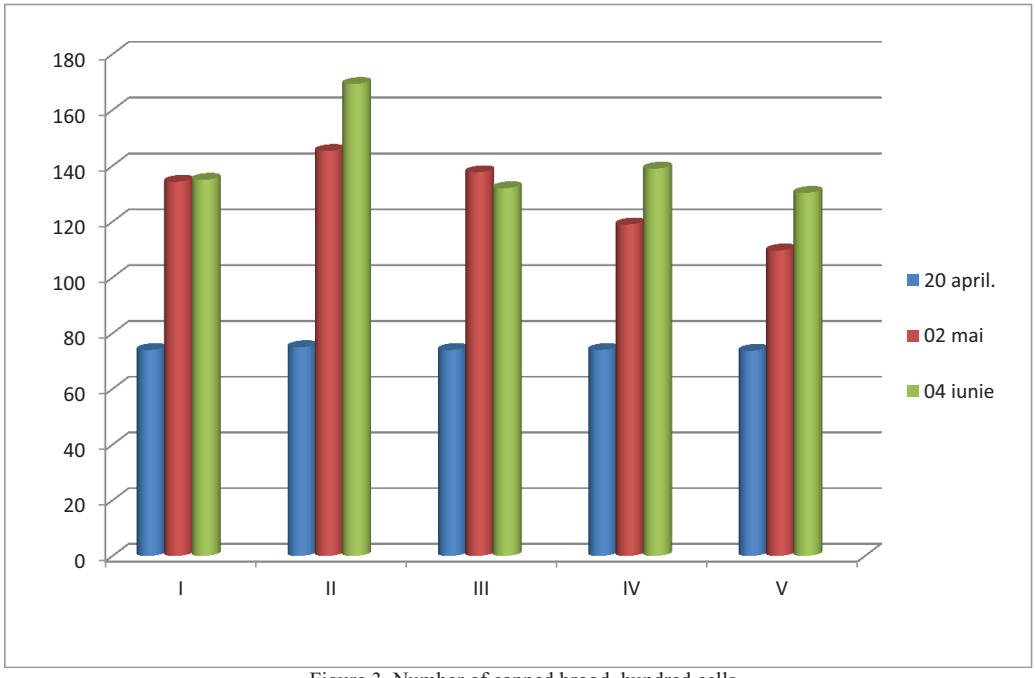

Figure 3. Number of capped brood, hundred cells

The largest quantity of honey from the white acacia has been deposited by families from the 3rd group, averaging 43.3 kg or 12.47% more than the control group (Figure 4).

Therefore the stimulatory feeding of bee families in the spring with the administration of sugar syrup together with the probiotic "Bilaxan" kept in horizontal hives provided a surplus of honey of 12.24% on average and a family in the – in multi-level hives 4.94 to 12.47% more than in the control group.

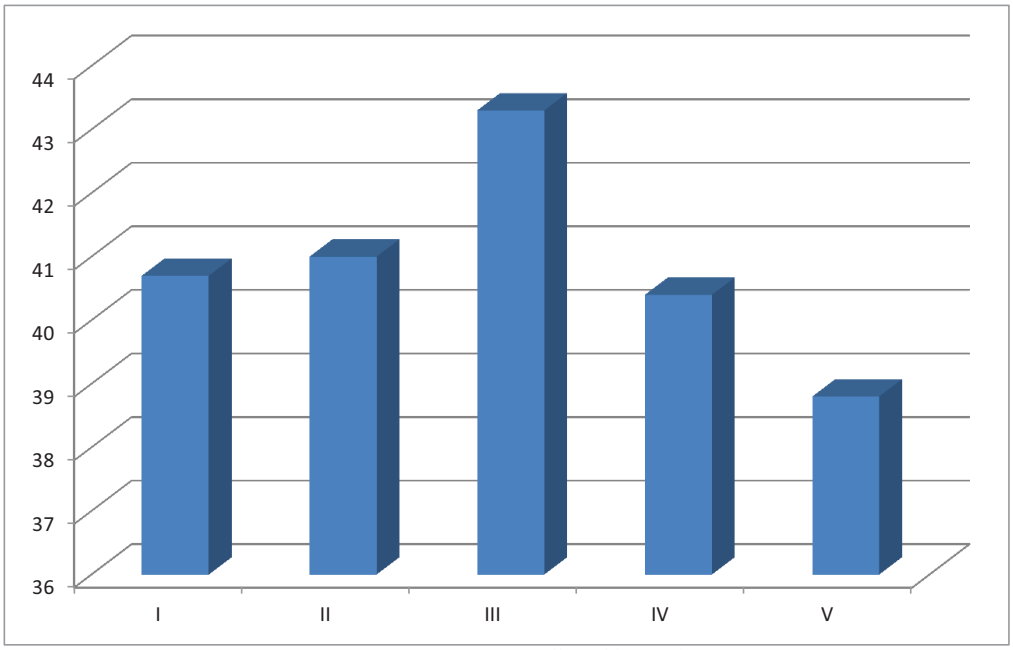

Figure 4. Quantity of collected honey, kg

CONCLUSIONS

1. The optimal dose of probiotic "Bilaxan" for the stimulatory feeding for bees in spring is 100-150 mg/litre of sugar syrup
2. Feeding bee families in spring during the lack of honey harvest without bees flying in the area can be done once, every 6-12 days using 0.5-1.0 l sugar syrup.
3. The use of the "Bilaxan" probiotic in bee nutrition stimulates power growth in families kept in horizontal hives by 8.29%, queens prolificacy and number of capped brood from 2.51 to 31.41% and 12.24% and productivity in multi-levelled hives from 3.89 to 5.56%; 8.48 to 32.45%, and 4.94 to 12.47%.

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