

# Use of nutritional Additives in Stimulating Feeding of Bees during Spring Time

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## Abstract

For high yields obtaining is necessary to grow strong bee families in the spring. Therefore, of interest is the study of influence of using nutritional additives on early development stimulating and population increase of bee families to capitalize honey flows. It has been found that the optimum dose of the nutritional stimulant " Stimulcom " is 10 g / l of sugar syrup 3.0. The use of the nutritional additive "Stimulcom" provides the increased productivity of bee families with 6.14 and 54.73 % compared with the control groups. Spring stimulating feeding is recommended to perform once in every 10-12 days using one liter of sugar syrup mixture with the nutrient after the spring control until the start of harvest of the white acacia.

**Keywords:** bee families, feeding stimulants, honey, nutritional additives, sugar syrup.

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## 1. Introduction

Bees collect from the flowers nectar and pollen, which are processed into food – honey and bee bread. The food of bees contains all the necessary vital nutrients - proteins, lipids, carbohydrates, minerals, vitamins. For the vital processes the bee family needs a considerable amount of food - honey and bee bread. Strong family during a year consumes 90 kg honey: during winter rest - about 10 kg, while in the active vital period - spring, summer and fall – about 80 kg (for life maintenance of adult individuals, larval feeding, the secretion of wax, energy consumption during flight, processing of nectar into honey) [1].

In cases when family food reserve amount is insufficient, the bees must be fed. As a honey substitute the sugar syrup is used. For brood growth stimulating in the spring and queen rearing the sugar syrup is used in a concentration of 50% (1 kg of sugar in 1 l of water) [2].

It is known the method of bees feeding, which includes the feeding of bees with a mixture of

50% sugar syrup and a nutritional additive in an amount of 1.0 l of the mixture to a family of bees, over every 10-12 days, starting from the first days of April until the beginning of the main harvest. At the same time, the nutritional additive contains sodium humate / potassium, extract / autolysated of yeast, lactic acid, beta-gliucan which is added to sugar syrup. As nutritional additive is used "Vitacorm AD-1", obtained from the biological raw material (yeast bread) by autolyzed yeast cell under the action of lysosomal enzymes [3].

In order to stimulate growth of juvenile the sugar syrup is used, which often are added vitamins, trace elements, flower pollen, bee bread, extracts of coniferous [4].

It has been found that the use of plant extracts in the nutrition of the bees have positive effects [5, 6, 7, 8, 9] both on the development of bee families, in the fight against pathogens (Nosema, Varrooa), and impact on the queen's quality [10].

Stimulant feeding contributes to have strong families to the apiary. In the families earlier occurs physiological maturity of the individuals than a large number of flying bees are formed which contributes to an increased amount of honey-loads [11].

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The increasing of productivity, the numbers of bee families, the liquidation of mortality causes of thousands of families have to be combined with the implementation of modern technologies in beekeeping. Modern maintenance methods, also using of additional feeding of bees with biologically active nutritional additives in different development periods creates new opportunities for more effective development of beekeeping, taking into account regional peculiarities [12-14].

Development of bee families in the spring season, and keeping them at a high biological and productive level requires the existence of a honey base to ensure the harvest of nectar and pollen throughout the active season and rational feeding of bees in the periods with the lack of natural picking [15, 16].

The use of sugar syrup in food as a stimulant is fully effective only if the food contains protein substances, as juvenile growth can take place only with an amount of the protein. If protein food is missing in the hive or nature, bees use their own body reserves of proteins [17].

Based on the above he studies of influence of used nutritional additives on early development stimulating and increase of population of bee family for honey flows capitalization is of great interest.

## 2. Materials and methods

As an object of investigation the hives of Carpathian breed the apiaries from Cicileni village, Hincesti district and Oniscani village, Calarasi district have served. To determine the influence of nutritional stimulant "Stimulcom" used in bees feeding, on bee immunity increasing, normalizing of metabolic processes, growth, development and productivity of bee families were created three groups in each apiary. Bee families in group I (experimental) received one liter of sugar syrup with a nutritional stimulant "Stimulcom" – 10 g / 3 l. The families of bees in group II (control I) were administered 1 liter of sugar syrup with 3 ml / 1 of a nutritional additive "Vitacorm AD-1" in the third group (control II) was used 1 liter of pure sugar syrup. The nutritional additive composition "AD-1 Vitacorm" consists of humate sodium / potassium extract / autolyzed yeast, lactic acid, beta-glucan and water.

## 3. Results and discussion

The composition of the protein-vitamin feed (nutrient stimulant "Stimulcom") consists of: some nutritional additives, including amino acids, micro- and macro-elements, vitamins, antioxidants, detoxication substances and other biologically active clades. The feeding of bees is carried out with a mixture of 50% sugar syrup and 1.0 liter of nutritional stimulant mixture for a bee family, over every 10 ... 12 days from the first day of April until the beginning of the main harvest. At the same time stimulant nutritional contains, pollen (balls), milk powder, sugar powder and nutritional additives (Bionorm P), particularly a freeze-dried product of the cells selected by resistance to antibiotics that are antagonistic to pathogenic microflora of lacto- and bifidobacteria strains with activity of 1.106 KOE / g, containing probiotic – fructolgozaharide (lactulose), vitamins of group B, pectin, natural acidifying and an additive symbiotic complex (Belaxan) produced from lyophilized cells specially selected by resistance to antibiotics that are antagonistic microflora pathogenic strains of lacto- and bifidobacterium.

The syrup was prepared in the following manner: the water was heated to boiling, then sugar was added 1: 1 in a ratio of, 1 liter of water: 1 kg of sugar, the solution was stirred until the sugar has dissolved completely. When the syrup was cooled to 30-40<sup>0</sup>C the nutritional stimulant was added in a dose of 10.0 g to 3.0 liters of 50% sugar syrup and stirred together.

To determine the optimal conditions for the use of nutrient stimulant at different apiaries from Hancesti and Calaras districts there was studied the influence on the increase of bee's immunity, normalization of the metabolic process, growth, early development and productivity of bee families.

Bee families in the apiary from the village Ciuciuleni, Hincesti district were fed with one liter of sugar syrup, every 10-12 days, from 27 of March until the main harvest from white acacia.

The research results showed that at the moment of formation the experimental groups (03/27/2016) the number of honeycombs in the bee families nest was on average from 8.33 to 9.33 pc., power - of 6.67 to 7.0 spaces between combs populated with the bee, capped brood - from 4.0 to 6.0 hundred cells and from 4.67 to 5.0 kg (Table 1).

Also we can mention that the queen prolificacy experimental group I was increased to 456 eggs in 24 hours and the control groups I - control 277 and II - 236 pcs. During this period bee family in

group I had grown 54.7 hundred of capped brood or with 64.26 to 93.29% more than in control groups I and II.

**Table 1.** Morpho-productive indices of bee families at the apiaries from Ciuciuleni vilage Hancesti district

Group	Remedy administered per liter of sugar syrup	Total number of combs in a family	Family power, spaces between combs populated with bees	Capped brood, hundred cells	Honey reserve, kg
<b>27.03.2016</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	9.33±0.667	7.0±0.577	5.33±1.333	5.0±0.577
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	8.33±0.882	6.67±0.667	6.0±1.155	5.0±0.577
III	Sugar syrup (Control II)	8.67±0.667	6.67±0.333	4.0±0.0	4.67±0.333
<b>08.04.2016</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	10.67±0.88	8.67±0.882	54.7±11.92	4.0±0.577
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	9.0±0.577	7.67±0.333	33.3±5.783	4.0±0.577
III	Sugar syrup (ControlIII)	10.0±0.577	7.67±0.333	28.3±11.39	3.0±0.0
<b>22.04.2016</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	13.0±1.528	11.67±1.202	137.3±6.36	3.33±0.333
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	11.33±0.33	10.33±0.333	123.3±7.69	3.33±0.333
III	Sugar syrup (Control II)	11.0±1.00	9.0±0.577	103.0±12.53	2.67±0.333
<b>02.05.2016</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	14.67±0.88	13.33±0.882	141.0±14.84	3.33±0.667
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	13.0±1.155	11.67±0.882	144.3±8.647	4.0±0.577
III	Sugar syrup (ControlIII)	12.67±1.20	11.0±1.00	100.0±18.88	3.0±0.577
<b>15.05.2016</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	16.3±1.202	15.3±1.202	135.3±2.404	2.67±0.66
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	15.7±0.667	13.3±0.333	120.0±13.11	2.33±0.333
III	Sugar syrup (Control II)	15.0±1.0	13.0±1.00	97.3±14.62	2.0±0.0
<b>05.06.2016 after harvesting of white acacia</b>					
I	Sugar syrup + Stimulcom – 10 g/3 l	18.7±0.667	17.7±0.667	-	21.5±1.115
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (Control I)	18.0±0.0	17.0±0.0	-	20.13±4.51
III	Sugar syrup (Control II)	17.3±1.202	16.3±1.202	-	19.0±3.412

At the next control of bee families conducted on 22 of April 2016 was found that the strength of families in experimental group I was higher by 12.97% compared to the second group (control I) and 29.67% - group III (control II). Bee families in group I (experimental) grew up averaging 137.3 hundred cells of capped brood or with 11.35% more than in group II and 33.3% (group III). Lack of honey harvest around the apiary has reduced

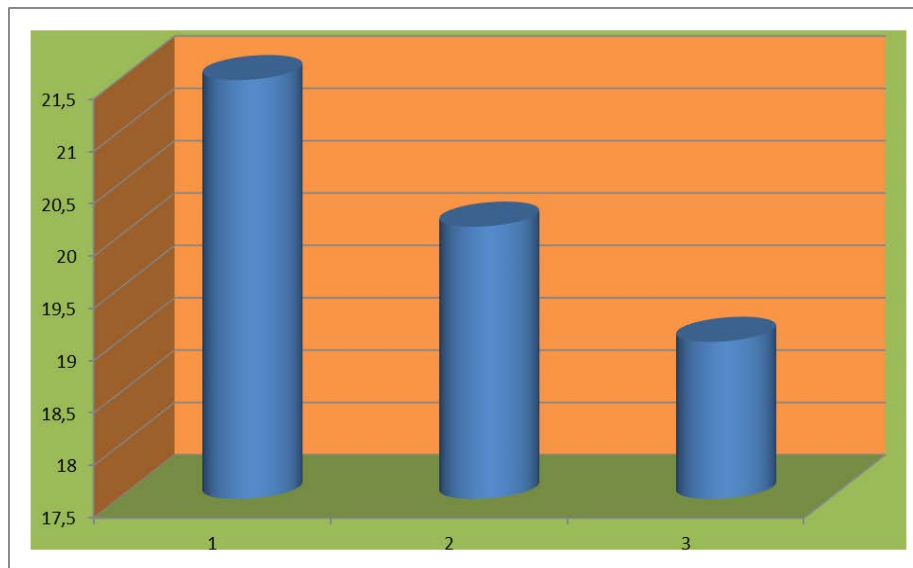
food reserves from the nest, maintenance and growth of juvenile individuals.

At the control of bee families before harvesting of white acacia was pointed out that the power of group I (experimental) averaged 15.3 spaces between honeycombs populated with bees or 15.04% move to group II, respectively 17.69% – group III.

Prolificacy of queens during this period averaged 1127 eggs in 24 hours in group I (experimental) in group II (control I) - 1000 pieces, and in group III (control II) - 811 pcs. Bee families in the experimental group had grew 135.3 hundred cells of capped brood, or 12.75% more than in second group (control I) and in group III 39.05% (control II).

At the inspection of bee families after harvesting the white acacia on 5 of June, 2016 it was

established that using of sugar syrup mixed with protein-vitamin food with nutritional additives in the spring without nectar and pollen picking increases their productivity. Bee families in group I (experimental) were collected and stored in the nest, on the average, 21.5 kg, or 1.37 to 2.5 kg, which is 6.81% to 13.13% compared to control groups (Figure 1).



**Figure 1.** The amount of honey stored from white acacia, the average medium from bee family, kg (Apiary Ciuciuleni vilage Hancesti district)

Controlling of bee families at the apiary from Oniscani village Calaras district conducted on February 23, 2016 was established that in the nest averaged 6.67 to 7.67 combs and power being 5,67- 6.67 spaces between combs populated with bees.

At the control of the bee families conducted on May 5 prior white acacia flowering was revealed that the number of the combs in the hives ranged from 10.0 (group III) and 19.3 units (group I), and power, respectively - 8.0 and 17.0 spaces between the combs populated with bees (Table 2).

Feeding the bees with a mixture of sugar syrup and a nutritional additive "Stimulcom" in an amount of 10.0 g / 3 l stimulates queen's prolificacy, that have made 1302 eggs within 24 hours. Prolificacy of queens in the second group (control I) consisted 1202 eggs and in group III (control II) – 754 eggs in 24 hours. The reserve of honey in the nest varied between 3.83 kg (group II) to 7.0 kg (group I).

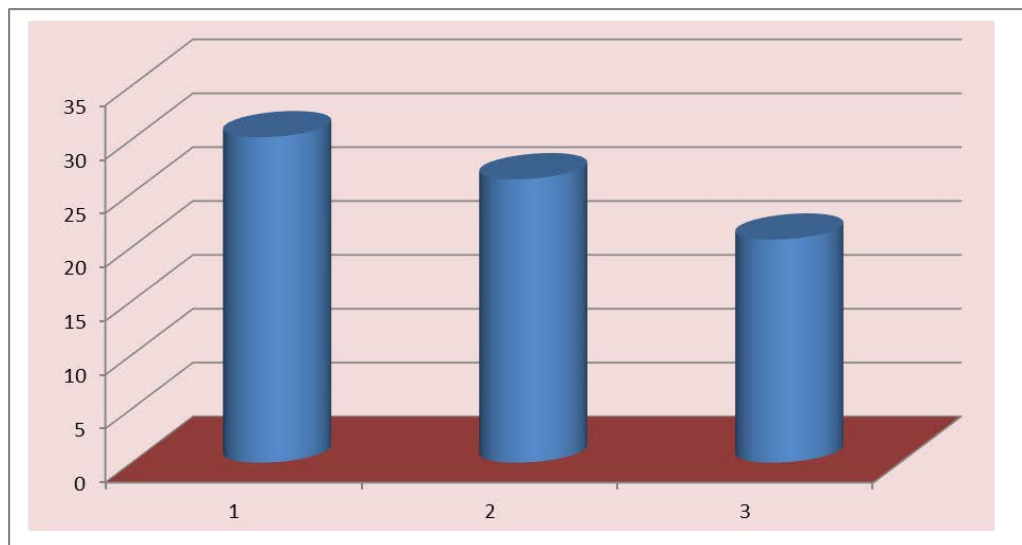
The control conducted on May 28, 2016 after picking the white acacia was found that the use of nutritional additive "Stimulcom" in stimulating feeding during spring without nectar and pollen harvest increases production of honey stored in the nest. Bee families in the experimental group I stored in the nest from white acacia averaging 30.17 kg or 3.9 kg (group II) and 9.44 kg (group III), which is the 14,85- 45.57% more than in control groups I and II (Figure 2).

Therefore, on the basis of the results carried out in two different apiaries experiences places with different honey base, we can mention that the nutritional optimum dose of stimulant is 10 g / l of sugar syrup 3.0, and the feeding is carried out every 10-12 days with one liter after spring control until the early harvesting of white acacia.

Using a nutritional stimulant "Stimulcom" ensures increasing of the productivity of bee families with 6.14 and 54.73% compared to control groups.

**Table 2.** Morpho-productive indices of bee families at the apiaries from Oniscani village Calaras district

Group	Remedy administered per liter of sugar syrup	Total number of combs in a family	Family power, spaces between combs populated with bees	Capped brood, hundred cells	Honey reserve, kg
<b>01.04.2016</b>					
I	Sugar syrup + Stimulcom 10 g/3 l	8.67±0.882	7.67±0.882	4.0±0.577	6.67±0.882
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (control I)	7.67±0.333	6.67±0.333	4.0±0.577	6.67±0.333
III	Sugar syrup (control II)	7.0±0.577	6.0±0.577	3.0±0.577	5.67±0.882
<b>05.05.2016</b>					
I	Sugar syrup + Stimulcom 10 g/3 l	19.3±0.333	17.0±0.0	156.3±16.89	7.0±1.00
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (control I)	16.0±3.055	11.67±1.764	144.3±17.46	3.83±1.59
III	Sugar syrup (control II)	10.0±0.0	8.0±0.0	90.5±34.50	4.0±1.732
<b>28.05.2016 after harvesting of white acacia</b>					
I	Sugar syrup +Stimulcom 10 g/3 l	27.0±0.0	21.0±2.082	-	30.17±4.772
II	Sugar syrup +Vitacorm AD-1 – 3 ml/l (control I)	27.0±0.0	17.67±2.028	-	26.27±9.675
III	Sugar syrup (control II)	27.0±0.0	17.0±5.132	-	20.73±9.954



**Figure 2.** The amount of honey stored from white acacia, the average medium from bee family, kg (Apiary Oniscani vilage Calaras district)

#### 4. Conclusions

1. It was revealed that the optimum dose of the nutritional stimulant "Stimulcom" is 10 g / l of sugar syrup 3.0.
2. The use of the nutrient stimulant "Stimulcom" provides increased productivity of bee families with 54.73 and 6.14 % compared with for the control groups.
3. Spring stimulating feeding is recommended to perform once every 10-12 days using one liter of

mixture of sugar syrup with the nutrient stimulant after the spring control until the start of harvest of the white acacia.

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